AN ANNOTATED CHECK LIST OF THE LAND SHELLS OF SOUTH AND CENTRAL AUSTRALIA.

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(*Contribution from the Australian Museum*).

During the preparation of a complete account of the Non-Marine Mollusca of Australia it became necessary to review the known faunulas of the various States, and the present account is issued for the use and co-operation of local students. It has become evident that there is a much larger fauna than has hitherto been recognised, and that it will be greatly increased by renewed collecting.

The well known South Australian conchologists, Professor Ralph Tate and Sir Joseph C. Verco, had both co-operated with my predecessor, Mr. Charles Hedley, so that a fairly comprehensive collection is available for study in the Australian Museum. Mr. Bernard C. Cotton, conchologist at the Adelaide Museum, has continued this valuable relationship, and has forwarded me a large series of mollusca, so that this essay should visualise our knowledge at the present time fairly accurately.

It is surprising to find that this will be the first attempt at a checklist of South Australian Land Shells for over sixty years, as Angas published a list in 1875, totalling 28 species only.

One hundred and thirty years ago the famous French naturalists, Peron and Lesueur, collected land shells at Kangaroo Island and on the islands of St. Peter and St. Francis, Nuyts' Archipelago, and these were named and figured by Ferussac about 1819 to 1821. Probably the English naturalists with Flinders also picked up specimens, but we have no exact record of such. Years later that enthusiastic conchologist, Angas, who lived in the colony for three years, secured many species, and from then onwards Tate took up the task, but he was never able to furnish the complete account he hoped for. The Horn Scientific Expedition to Central Australia brought back a good number of land shells, and these were duly described and figured by Tate, with some anatomical notes by Hedley. It has been found impossible to utilise the artificial boundaries of South and Central Australia in this group so that all the forms from these

areas are listed. It must be mentioned that this is purely a conchological review, as until the shell characters are well understood, it is futile to attempt to deal with the somewhat illusory factors commonly considered in the description and separation of molluscan groups by anatomical data.

I have published a map, which is here reproduced, attempting to show the natural divisions of the fauna and flora of Australia. The molluscan faunula here catalogued is that of the Centralian or Larapintine Area, and has been called the Eremian or Eyrean Faunula. The molluscan shells are easily recognised from their desert appearance, and little is scientifically known about their distribution, life history or variation. The well known Horn

Expedition is responsible for many of the species, and also many of the problems, as they lumped together specimens from the various places under the vague locality, Central Australia. If series were separately collected and studied, the variation seen might be accurately determined as geographic, ecologic or individual. The negative features of this faunula are as notable as the positive, as the Leeuwinian family, Bothriembryontidae, is only represented by three distinct forms, two coastal and one interior, a fourth entering the western limit only. No Dampierian species have yet been recognised, though some may occur in the north-west of this Area whence we have no molluscs. Peronian peculiar forms are notably absent, especially those characteristic of the Oxleyan Sub-Area, while the Solanderian *Xanthomelon, Hadra, Sphaerospira, Austrochloritis,* etc., are really missing, but appear to be ancestral relatives of *Sinumelon, Meracomelon, Pleuroxia, Glyptorhagada,* etc.

Throughout Australia land shells prove to be apparently very variable and this variation does not seem at first sight truly geographical and has been regarded as colonial or ecological, but it may be due to geological formation and hence the study of Geozoology becomes paramount. Thus in this Centralian Area the mountain ranges are separated in time as well as space and hence the molluscan inhabitants differ. A series from the Musgrave Ranges differs decidedly from a similar series from the MacDonnell Range, and this does not occasion surprise when we know that a strong fault occurs between. Local conchologists must consider the geology in connection with land shells and also determine whether the specimens collected are truly geographical forms or merely ecological variations. The latter will provide a deal of study, as these may be further divided into forms dependent on the local ground conditions, which may be termed geodecols, or have been produced by climatic moods which differ in years, the former being stable for the place, the latter unstable through time variation: the latter may be called horecols, and the determination of Australian land molluscs must be governed by a knowledge of all the environmental conditions, including the climatic. I will explain these terms more fully in another place.

The excellent figures, provided by Miss Joyce Allan, of the Australian Museum, to whom my best thanks are again due, will be most useful to students as, in addition to the new species, they illustrate each South Australian genus.

Phylum Mollusca.

This Phylum includes all molluscan animals related to Oysters, Cockles, Mussels, Whelks, Winkles, Sea Devils, Cuttles, Sea Butterflies, and the majority of objects known as Shells. The common Snail represents a series which has taken to living on land, the great majority of shells belonging to the sea. These land-living forms, as they breathe air, have been classed together as a Subclass Pulmonata, of a larger Class Gastropoda. Another large Class, Pelecypoda, includes the bivalve shells such as Oysters, Mussels, and none of these live on land, but a number are found in rivers, lakes, etc., and are part of the Freshwater Mollusca, which, however, also includes a number of shells belonging to the Class Gastropoda. Then in order to bring system into the recognition of these land Snails, many of which are much alike superficially, though are of different origin, a great deal of subdivision is necessary. Thus we arrive at an Order Stylommatophora, to which all the Centralian Land Shells belong. The first family, Vertiginidae, includes a series of small pupoid molluscs, which are difficult to distinguish without microscopic examination, the largest being only about a quarter of an inch long.

Although I followed Pilsbry in placing all the Australian Pupoid shells in one family, Vertiginidae, further study has shown that this was obviously incorrect, and I find that recent specialists have differentiated the groups with family rank, even as Pilsbry himself had suggested. Thiele, indeed, followed Pilsbry, but he was throughout ultra conservative, save in his own researches. Steenberg, from anatomical investigation, allowed family rank to most of the groups, agreeing with Pilsbry's subfamilies. Under Steenberg's scheme *Australbinula* would belong to one family and *Themapupa* and *Omegapilla* to another.

Genus **Australbinula**.

1916. *Australbinula* Pilsbry, Man. Conch. (Tryon), 2nd Ser., Vol. XXIV, (93), p.11, December 18.
Orthotype (*Gastrocopta*) *rossiteri*.

1917. *Australbinula* Pilsbry, Man. Conch. (Tryon), 2nd Ser., Vol. XXIV, (94), pp.155/166, July 18.
Orthotype *Gastrocopta hedleyi* Pilsbry=*rossiteri* supra.

A genus of small Pupoid shells, generally dextral, faintly striate, about 3 mm. long, with the small mouth almost closed by teeth blocking the aperture; the teeth generally number five to seven, a large one on the columella, one to three, called the

parietal, only one of which is large, on the base of the shell, and the other three or four inside the outer lip. The species are differentiated by size and form, and to some extent variation in the teeth, as to shape and position. They are difficult to separate without microscopic examination.

Key to Species.

Shell minute, dextral, large parietal tooth recurved *larapinta*

Shell larger, dextral, large parietal tooth not recurved though twisted *margaretae*

Shell similar but smaller than the preceding, but teeth a little smaller *tatei*

Australbinula larapinta.

1896. *Pupa larapinta* Tate, Rep. Horn. Sci. Exped. Centr. Austr., Zool. pt. II, p.205, pl. XIX, f.19, February, Central Australia=Palm Creek, fide topotypes in A. M. ex Horn.

1917. *Gastrocopta larapinta* Pilsbry, Man. Conch. (Tryon), Ser. 2, (pt. 94), Vol. XXIV, p.168, pl. 30, figs. 5-7, 9-11.

1917. *Gastrocopta larapinta deserti* Pilsbry, Man. Conch. (Tryon), Ser. 2, (pt. 94), Vol. XXIV, p.170, pl. 30, ff.1-3, July 18. Central Australia=Tempe Downs, etc.

Pilsbry examined two lots sent by Tate, and noted that they were very mixed apparently from various localities, and differentiated five variations, one of which he named as a new subspecies as above. It can not be reinstated until series from exact localities are carefully criticised. This *deserti* is smaller with weaker lamellae, small parietal tubercle missing, and the medium palatal has also disappeared. The shells appear adult but similar formation of teeth is seen in juvenile *larapinta*.

Australbinula tatei.

1917. *Gastrocopta tatei* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXIV (pt. 94), p.165, pl. 26, ff.9-10: pl. 30, fig. 12, July 18. Central Australia.

This species was described from specimens sent to Pilsbry by Tate under the names of *Pupa larapinta* and *mooreana*. The latter had been described by Smith from Roebuck Bay, North-West Australia, and obviously would not be likely to occur in Central Australia. Tate, under the name *Pupa mooreana*, (Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., p.206, pl. XIX, fig.

20, 1896), wrote: "A shell which I refer to this species was collected in sonsiderable numbers in Central Australia. The majority of the specimens have the denticulation of the aperture as figured, and described, by Smith, which consists of a strong plait in the middle line of the body whorl, one on the columella, and two palatal, the four being approximately equidistant, whilst a denticle is situated at the insertion of the outer lip. Some variation in this arrangement is supplied by my specimens, the parietal and columellar plaits are relatively very large and occasionally a denticle is interposed, as also another between the two palatal plaits, whilst the tubercle at the insertion of the labrum is often absent. *Localities.*—Tempe Downs, Reedy Creek, Palm Creek, Stuart's Pass, Painter Spring and Alice Springs." Pilsbry thereupon separated some specimens as "*tatei*" but he had not seen *margaretae,* and comparison suggests that these are very closely allied. Pilsbry later (Man. Conch. (Tryon) Ser. 2, Vol. XXVI, (pt. 104), p.230, pl. 24, figs. 6, 7, Nov. 1921) figured true *mooreana,* and showed it was a very different shell.

Australbinula margaretae. Pl. I, fig. 4.

1868. *Pupa margaretae* Cox, Mon. Austr. Land Shells, p.80, pl. XIV, fig. 20a, May. Wallaroo, South Australia (Masters).

1917. *Gastrocopta margaretae* Pilsbry. Man. Conch. (Tryon), Ser. 2, Vol. XXIV, (pt. 94), p.160, pl. 26, figs. 7, 8. July 18.

All that Pilsbry could do was to copy Cox's description and figure, as Hedley reported that the type could not be found in the Australian Museum, and no one had apparently recognised it in South Australia.

Specimens sent from the South Australian Museum from the "rocky slopes of Mannum Cliffs" labelled as "*margaretae*" agree very closely with the description and figure and can be well accepted as typical. This species shows a long rather twisted parietal lamella, similar to that of *tatei,* and quite different from that of *larapinta.* The basal tooth is large and the upper palatal is deeply set.

Genus **Themapupa.**

1930. *Themapupa* Iredale, Vict. Naturalist, Vol. 47, p.120, Nov. Haplotype *Pupa beltiana* Tate.

These shells are much larger Pupoid shells than the preceding, from 4 mm. to 6 mm. long, and are either sinistral or dextral, the mouth open with only a tubercle on the base of the shell

near the edge of the outer lip. The species appear to vary more than in other Pupoid genera, and hence we have five recognisable species on the list.

Key to Species.

Shell about 5.5 mm. long, dextral, tapering, weakly striate *beltiana.*

Shell larger about 6.5 mm. long, sinistral, tapering, but not agreeing in form with the preceding *adelaidae.*

Shell a little smaller, 5.5 mm. long, sinistral, and broader *eremicola.*

Shell still less, 4.5 mm. long, sinistral, narrower than preceding *myoporinae.*

Shell more elegant, very narrow, not tapering, about 4.25 mm. long by 1.5 mm. in breadth, sinistral. *ischna.*

Themapupa beltiana.

1894. *Pupa beltiana* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.191, November; Central Australia.

1896. Rep. Horn. Sci. Exped. Centr. Austr (pt. II), Zool., p.204, pl. XVIII, fig. 15, February, as dextral form of *P. contraria* Smith.

1921. *Pupoides contrarius beltianus* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 103), p.145, pl. 15, figs. 5, 7, 8, August 4.

Tate described this dextral shell observing however "rarely sinistral" and later accepted Smith's opinion that it was merely the dextral form of *P. contraria* Smith, a West Australian shell. Pilsbry allowed this as a variety, suggesting that it was probably a distinct species, and that he had seen no sinistral specimens.

Themapupa eremicola.

1894. *Pupa eremicola* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.191, November; Central Australia.

1896. Rep. Horn Sci. Exped. Centr Austr., pt. II, Zool., p.204, pl.XIX, fig. 17, February, as large form of *P. contraria* Smith (sinistral).

1921. *Pupoides contrarius* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 103), p.144, pl. 15, figs, 9, 10, August 4.

Smith (Proc. Mal. Soc. (Lond.), Vol. I, p.96, 1894, June) described *Pupa contraria* from Houtman's Abrolhos, West Australia, a sinistral shell measuring, "Length 4.5, diameter 2 mm.; aperture 1.5 mm. long." Tate described *Pupa eremicola* from Central Australia, a different shell, 5.5 long by 2.5 mm. wide.

Later Tate regarded this as a larger form only of the West Australian shell, and in this he was followed by Pilsbry, neither of whom had seen the latter, but were accepting Smith's determination.

Themapupa ischna. Pl. I, fig. 8.

1894. *Pupa ischna* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.191, November: Central Australia.

1896. Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., p.204, pl. XIX, fig. 16, February. Alice Springs and Palm Creek.

1921. *Pupoides ischnus* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 103), p.146, pl. 15, figs. 3, 4, August 4.

Tate gave as measurements "Length, 4.25: width 1.25 mm." and later still, citing these figures, gave as localities, "Alice Springs and Palm Creek." Pilsbry later wrote "Specimens from Palm Creek, which may be taken as the type locality, measure:

Length 4.45, diam. 1.7, aperture 1.57 mm.: $5\frac{3}{4}$ whorls.

Length 4, diam. 1.7, aperture 1.3 mm.: $5\frac{1}{2}$ whorls."

As these distinctly differ in width, and as specimens from Alice Springs agree with the figures given by Tate, the latter locality must be accepted, and the broader Palm Creek shell named *Themapupa ischna latior* subsp. nov.

Themapupa myoporinae.

1880. *Bulimus myoporinae* Tate, Trans. Proc. Roy. Soc., South Austr., Vol. III, p.104, new name for

1879. *Bulimus sinistrorsus* Tate, Trans. Proc. Phil. Soc. Adelaide, South Austr., 1878-9, p.134, pl. V, fig. 4. Peelunibie, Head of the Bight, South Australia.

Not *Bulimus sinistrorsus* Serres, Ann. Soc. Ag. djon, III, 184, 484.

1921. *Pupoides myoporinae* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 103), p.146, pl. 15, fig. 6. August 4 (copied).

Themapupa adelaidae.

1864. *Buliminus* (*Chondrula*) *adelaidae* Angas, Proc. Zool. Soc. (Lond), 1863, p.522, April 20 1864, ex A. Adams and Angas MS. South Australia.

1864. *Pupa ramsayi* Cox, Cat. Austr. Land Shells, p.28. Point Lowly, South Australia.

1868. *Bulimus adelaidae* Cox, Man. Austr. Land Shells, p.69, pl. XIII, fig. 5, May.

1921. *Pupoides adelaidae* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 103), p.140, pl. 15, figs. 1-2, August 4.

Genus **Omegapilla.**

1937. *Omegapilla* Iredale, Austr. Zool. Vol. VIII, p.304, March 12.

Orthotype *Pupa nelsoni* Cox.

Small pupoid shells, about 3 mm. to 4 mm. long, mouth small, sinistral or dextral, the mouth with three or four teeth only of a different character from those of *Australbinula*. . .

Key to Species.

Shell sinistral, 4 mm. long, with no upper palatal fold *australis*

Shell dextral, a little smaller, 3.5 mm. long, and broader *ficulnea.*

Omegapilla australis. Pl. I, fig. 6.

1864. *Vertigo australis* Angas, Proc. Zool. Soc. (Lond.) 1863, p.522, April 20 1864, ex Adams and Angas MS.; Rapid Bay, South Australia.

1868. *Pupa australis* Cox, Mon. Austr. Land Shells, p.79, pl. XX, fig. 15, May, from a painting of the type by Angas.

1867. *Pupa lincolnensis* Cox, Proc. Zool. Soc. (Lond.) 1867, p.39, May 25: Port Lincoln, South Australia (Masters).

1868. *Pupa lincolniensis* Cox, Mon. Austr. Land Shells, p.80, pl. XIV, fig. 16, May.

1921. *Pupilla australis* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 104), p.218, pl. 23, figs. 13, 14 (Edithburg), November.

As Rapid Bay is on Fleurieu Peninsula while Port Lincoln is on Eyre's Peninsula, these forms may later prove separable. Hitherto the range allowed for these minutiae has been enormous, and probably accounts for the great variation recorded.

Omegapilla ficulnea.

1894. *Pupa ficulnea* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.191, November; Central Australia.

1896. Rep. Horn Sci. Exped. Centr Austr, pt. II, Zool.. p.205, pl. XIX, fig. 18, February. Palm Creek, off Glen of Palms, in Krichauff Range.

1921. *Pupilla ficulnea* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. XXVI, (pt. 104), p.221, pl. 23, figs. 20, 21, November.

Family **Subulinidae.**

The shells belonging to this family are easily recognised, as they are small, slender, elongate, glassy shells. The mouth is small and open with the outer lip thin and the columella straight.

Genus Eremopeas.

1906. *Eremopeas* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol XVIII, (pt. 70), p.115, April 10.

Orthotype *Stenogyra interioris* Tate.

The shells belonging to this family are so alike in appearance that a compound microscope is necessary to examine the detailed sculpture. In the group the protoconch will then be seen to be spirally striate, a feature otherwse only seen in African and South American shells, which are not closely related. Shell lengthened, 8-10 mm. long, with a width of 2 to 2.5 mm., awl shaped, apex blunt, surface very finely radially striate, surface glossy, mouth a small oval, umbilical chink present.

Eremopeas interioris. Pl. I, fig. 5.

1894. *Stenogyra interioris* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.191, November; Central Australia.

1896. Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., p.203, pl. XVIII, fig. 14, February. Common: Harts Range to Stokes' Pass, and from MacDonnell Range to Ilpilla Gorge.

Family Succineidae.

The members of this family are widely spread, but do not occur in New Zealand. The amber appearance is unmistakable and their shape and tenuity are peculiar, but they are often mistaken for freshwater Limneoids, whose similar shells are inhabited by an entirely different animal. Recent investigations of the animals of the members of the family Succineidae have shown that these differ essentially much more than the shell, and until the animals of the Australian forms are critically examined by expert anatomists, their interrelationship must remain obscure.

Two genera only are recognised at present from conchological features, but nothing definite is available yet.

Key to Species.

Shell with rather lengthened narrow spire, large body whorl, thin outer lip, and thin texture throughout *Austrosuccinea.*

Shell with shorter spire, body whorl more bulky, and of an arboreal nature *Arborcinea.*

Genus **Austrosuccinea.**

1937. *Austrosuccinea* Iredale, Austr. Zool., Vol. VIII, p.307, March 12.
Orthotype *Succinea australis* Ferussac.

The similarity of shell structure makes it difficult to deal with members of this family without long series and local knowledge.

Tate pointed out that the microscopic sculpture varied, but this is only clearly seen in fresh specimens; however, it can be used for the only two terrestrial species admitted.

Key to Species.

Shell with long spire, body whorl rounded, microscopic sculpture feeble *australis*
Shell with long spire, body whorl more slender, microscopic sculpture bold *interioris.*

Austrosuccinea australis. Pl. I, fig. 23.

1821. *Helix austalis* (sic) Ferussac, Tabl. Syst. Limacons, pt. II, p.31, January: p.27, "June"=May 12: pl. XI, fig. 11, probably with name, issued in livr. 2, Mch. 1819. Kangaroo Island and Isles St. Pierre and St. Francois (Peron).

1855. *Succinea strigata* Pfeiffer, Proc. Zool. Soc. (Lond.), 1854, p.297, May 8 1855: "Port Clarence, Behring's Straits" error="general in South Australia." Cf. Proc. Zool. Soc. (Lond.), 1863, p.522, 1864. Fig'd. Cox, Mon. Austr. Land Shells, p.88, pl. XV, fig. 1, May 1868.

1864. *Succinea rhodostoma* Cox, Cat. Austr. Land Shells, p.27. Point Lowly, South Australia.

Austrosuccinea interioris.

1894. *Succinea interioris* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.191, November. Central Australia.
Figd. Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool. p.207, pl. XIX, fig. 21, Feb. 1896. Palm Creek, Central Australia.

When Tate figured this species he gave a comparison with *S. scalarina,* which showed little distinction, but he did not mention the locality whence his specimens of so-called *scalarina* were taken. So many different forms have been called *scalarina* that this point becomes important.

Genus **Arborcinea.**

1937. *Arborcinea* Iredale, Austr. Zool., Vol. VIII, p.308, Mch. 12.
Orthotype *Succinea eucalypti* Cox.

The short spire, swollen body and arboreal habit suggested the differentiation of this group, which also seals its aperture with an epiphragm. The anatomical changes must be important in such a difference in living, the normal Succineoid groups being moisture loving. Examination of the shell reveals a bold sculpture, but also shows a thickened truncate columella.

Arborcinea arborea. Pl. I, fig. 25.

1864. *Succinea arborea* Angas, Proc. Zool. Soc. (Lond.) 1863, p.523, April 20 1864, ex A. Adams and Angas MS. Burniside; Hills near Adelaide, South Australia.
Figd. Cox, Mon, Austr, Land Shells, p.89, pl. XX, fig. 20, May 1868, (from a painting of the type by Angas).

A small species "shelters itself beneath the loose bark of the *Eucalypti.*"

Family **Bothriembryontidae.**

A family of Bulimid shells characteristic of the Leeuwinian Area, only three stragglers occurring in the Centralian Area, one in the interior and the other two along the south coast. A fourth penetrates into the extreme limit of the South Australian area westward. The interior form has the apex with spaced subvertical wrinkles and has been separated subgenerically from the typical forms which have the apex regularly pitted. The extraordinary development of this form of molluscan life in the extreme South-West corner of Australia is one of the most striking features of molluscan life, and the occurrence of these outliers in Centralia and South Australia is intriguing.

Shell elongate oval, spire tapering, about length of mouth, width a little more than half the length, mouth oval, outer lip thin, umbilicus a mere chink or closed, columella thickened and reflected, coloration varied, sculpture usually very weak radials or granules.

Genus **Bothriembryon.**

1894. *Bothriembryon* Pilsbry, Nautilus, Vol. VIII, p.36, July (new name for West Australian *Liparus*).
Orthotype *Bulimus melo* Quoy and Gaimard.

1861. *Liparus* Martens, Die Heliceen, (Albers), 2nd ed., p.229,
Orthotype *Bulimus inflatus* Lamarck.
Not *Liparus* Albers, Die Heliceen, 1st ed., p.172, Aug. 1850.

1933. *Hartogembryon* Iredale, Rec. Austr. Mus., Vol. XIX, p.41, Aug. 2.
Orthotype *Bulimus onslowi* Cox.

1933. *Larapintembryon* Iredale, Rec. Austr. Mus., Vol. XIX, p.41, Aug. 2.
Orthotype *Liparus spenceri* Tate.

1933. *Satagembryon* Iredale, Rec. Austr. Mus., Vol. XIX, p.41, Aug. 2.
Orthotype *Buliminus gratwicki* Cox.

Key to Species.

Shell large, stout, apex pitted, coloration white, sculpture granulose, length 25-30 mm., breadth 12-15 mm. *barretti.*

small, stout, apex pitted, coloration speckled, sculpture subgranulose, length 20 mm. breadth 14 mm. *mastersi.*

small, thin, apex pitted, coloration banded, sculpture fine, length 25 mm. breadth 15 mm. *angasianus.*

small, thin, apex wrinkled, coloration uniform brown, length 18-20 mm., breadth 12-13 mm. *spenceri.*

Bothriembryon barretti.

1930. *Bothriembryon barretti* Iredale, Vict. Naturalist, Vol. XLVII, pp. 119-120, fig. in text, November. Nullarbor Plain, South Australia (C. Barrett).

1879. *Bulimus indutus* var. *pallidus* Tate, Trans. Proc. Roy. Soc. Adelaide, S.A. 1878-9, p.134, Bunda Plateau, Nullarbor Plain, South Australia.
Not *Bulimus pallidus* C. B. Adams, Proc. Bost. Soc. N.H., Vol. II, p.12, 1845.

Bothriembryon mastersi. Pl. I, fig. 26.

1867. *Bulimus mastersi* Cox, Proc. Zool. Soc. (Lond.), 1867, p.39, May 25. Port Lincoln, South Australia (Masters).
Figd. Cox, Mon. Austr. Land Shells, p.77, pl. XIII, fig. 14, May 1868.

Bothriembryon angasianus.

1864. *Bulimus angasianus* Pfeiffer, Proc. Zool. Soc. (Lond.), 1863, p.528, April 20 1864, ex Angas loc. cit. p.522, Port Lincoln, South Australia.
Figd. Cox, Mon. Austr. Land Shells, p.70, pl. XIII, fig. 2, May 1868.

Bothriembryon spenceri.

1894. *Liparus spenceri* Tate, Trans. Proc. Roy. Soc. South Austr., Vol. XVIII, p.192, November; Central Australia.

Figd. Rep. Horn. Sci. Exped. Cent. Austr., pt. II, Zool., p.202, pl. XVIII, fig. 13, February 1896: Palm Creek.

Family **Laomidae.**

We now come to a series of small shells, somewhat helicoid in shape, not exceeding a few millimetres in width, and generally the height is less than the width. It is necessary to examine each specimen with a good lens, and then later with a compound microscope to accurately differentiate the species. Until recently these were all classed together under the name "Endodontidae," but the student soon recognises that there are several groups with distinct superficies, and these are here recognised as families. This course is necessary as otherwise the confusion would become greater, and there is already more than enough.

Key to Genera.

Shell small, conical, apical whorls smooth or delicately striate, umbilicus wide, sculpture of fine whorls of varying strength *Paralaoma*.

Shell larger, conical, apical whorls more boldly sculptured, umbilicus small, almost closed, sculpture more regular and with interstitial cross lining. *Excellaoma*.

Shell more conical, apical whorls smooth, umbilicus minute, sculpture obsolete, restricted *Magilaoma*.

It may be noted that these snails prefer dry situations.

Genus **Paralaoma.**

1913. *Paralaoma* Iredale, Proc. Mal. Soc. (Lond.), Vol. X, p.380, September.

Haplotype *P. raoulensis* Iredale.

The Kermadec type has the apex smooth, and this appears to be the case in the East Australian species, but in the South Australian forms a fine concentric apical striation is seen, obsolete in the mainland shell, and noticeable in the island forms. In other cases this is regarded as of high value, but it appears doubtful in this case. In order to keep the matter in review, the subgeneric name *Insullaoma* is introduced for the Hummock Island species, *riddlei*.

Key to Species.

Shell small, apex smooth, sculpture weak but of varying strength, umbilicus of medium size *arenicola* Tate=*stabilis*.

Shell a little flatter, apex apparently smooth, umbilicus wider *decresensis*.

Shell flattened, conical, apex boldly concentrically striate, sculpture very fine, subreticulate *riddlei*.

Shell flattened, conical, apex smooth, sculpture coarse, umbilicus still wider *retinodes*.

Paralaoma stabilis sp. nov. Pl. I, fig. 12.

The common species of Paralaoma has been regarded as *morti* Cox, the Sydney shell, but it is easily distinguished, and as there was a name *arenicola* Tate available that was used in my Basic List. I could not trace the usage of a prior *arenicola,* but have since found it used by Martens (Die Heliceen, (Albers), 2nd ed., p.120, 1861, for "Pfr. Mon. Helic. viv., Vol. III, p.875, based on *Helix polymorpha* var. *arenicola* Lowe, Proc. Zool. Soc. (Lond.), 1854, p.190, Mch. 16 1855), and therefore a new name must be introduced. Tate's *Helix arenicola* (Proc. Linn. Soc. N.S.W., Vol. II, p.291, June 1878) was named from Holdfast Bay, Yorkes Peninsula, South Australia, but I am selecting a Port Lincoln specimen for my type.

Shell very small, depressedly helicoid, thin, brown, apex smooth, adult sculpture radial ribs rather distant and minute intervening radial striae but no cross sculpture, ribs becoming obsolete towards the aperture. There is only a very faint subperipheral keel present, whorls otherwise three in number, rounded, umbilicus open, wide about one third the diameter of the shell. Mouth subcircular, a little descending, a little broader than high, lips thin, columella straight, scarcely reflected. Major diameter 2 mm., height 1.25 mm. Tate mentioned a transverse striation, which suggests his species was distinct, but there may be many species of small shells confused.

Paralaoma decresensis sp. nov. Pl. I, fig. 9.

Kangaroo Island specimens of *Paralaoma* differ from those of the mainland in being more depressed, umbilicus wider with the sculpture finer. The stronger ribs of the mainland form appear to be missing. Major diameter 2.25 mm., height 1.25 mm.

Paralaoma riddlei sp. nov. Pl. I, fig. 22.

Specimens from Hummock Island are of *Paralaoma* form but are more elevated, mouth larger, umbilicus much narrower, sculpture very finely reticulate and apex boldly strongly lined concentrically. The spire is more distinct on account of a notable peripheral sub-keeling. Major diameter 2 mm., height 1.25 mm.

Paralaoma retinodes.

1894. *Charopa retinodes* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.192, November. Central Australia.

1896. Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., p.187, pl. XVII, fig. 2, February. Reedy Creek, George Gills' Range.

Genus **Excellaoma.**

1937. *Excellaoma* Iredale, Austr. Zool., Vol. VIII, p.315, Mch. 12.

Orthotype *Helix retipora* Cox.

These species are larger than the preceding but have the umbilicus narrow or almost closed, the columella reflected: the protoconch is smooth, but sometimes obsoletely spirally striate, the adult regularly striate.

Key to Species.

Shell subconical, protoconch obsoletely spirally striate, umbilicus almost closed, sculpture similar to that of the preceding group, but showing indistinctly a reticulate appearance *retipora.*

Shell a little flatter, apex almost smooth and somewhat restricted, the umbilicus a little more open, the sculpture finer, the reticulate appearance emphasized; major diameter 6 mm., height 4 mm.

valens sp. nov.

Shell almost discoidal, apex still apparently smooth, the umbilicus almost closed, hidden by the columellar reflection, finely reticulately sculptured; major diameter 6 mm., height 3 mm. *neta* sp. nov.

Shell flattened, apex almost smooth, umbilicus open, sculpture stronger, irregular, especially on the earlier whorls, and cross sculpture obsolete.

pulleinei.

Excellaoma retipora.

1867. *Helix retipora* Cox, Proc. Zool. Soc. (Lond.) 1867, p.39, May 25. Flinders Range, South Australia (Masters).

1868. *Helix retepora* Cox, Mon. Austr. Land Shells, p.21, pl. VII, figs. 8, 8a, May.

Specimens from Port Lincoln are separable from the typical form as given above under the name *valens* pl. I, fig. 16, which is here provided for this form, while the shells from Kangaroo Island are given the name *neta* pl. I, fig. 15, the differences being indicated above.

Excellaoma pulleinei.

1899. *Flammulina pulleinei* Tate, Trans. Roy. Soc. South Austr., Vol. XXIII, p.247, pl. VI, ff. 1: a, c, December. Carrieton, South Australia (R. H. Pulleine).

Genus **Magilaoma.**

1937. *Magilaoma* Iredale, Austr. Zool., Vol. VIII, p.317, Mch. 12. Orthotype *M. parpictilis* Iredale.

This form has a different appearance from the preceding, as it is more conical, the stronger erect radial sculpture obsolete, but instead there is a very fine subordinate radial ribbing, the periphery strongly keeled, the base rounded, umbilicus small, deep, hidden by reflected columella, outer lip sharp, thin.

Magilaoma penolensis. Pl. I, fig. 10.

1868. *Helix penolensis* Cox, Proc. Zool. Soc. (Lond.), 1867, p.724, April 3 1868: Mon. Austr. Land Shells, p.8, pl. XI, fig. 12, May 1868. Penola, South Australia (T. Woods).

1878. *Helix pictilis* Tate, Proc. Linn. Soc. N.S.W., Vol. II, p.290, June. Cape Northumberland Cliffs, South Australia.

Family **Dipnelicidae.**

Some years ago some land shells were collected on Hummock Island, and sent to Hedley for report. One of these is a very beautiful little shell quite unlike any known South Australian snail. Hedley had marked it as "*Paralaoma* n. sp.", but it is no close relation to that genus, while it somewhat recalls the Tasmanian shells which are referred (perhaps unwisely) to the family Flammulinidae. Again from some aspects it suggests the family Rhytididae. Such an anomalous form deserves separation so that the animals may be investigated by some anatomist.

To locate it in any of the above families would tend to lose sight of it, and cause confusion, and it is a very important little snail. In addition to the Hummock Island it has been found on Pearson Island, one of the Investigator Group.

It has not yet been discovered on the mainland which suggests that it is a relict form of great age.

Genus **Dipnelix** nov.

Type **D. pertricosa** sp. nov. Pl. I, fig. 24.

Shell small, just reaching 10 mm. in diameter, thin, spire a little elevated, whorls few, last a little descending, umbilicus wide, open, about one third the diameter of shell, mouth a little oblique, a little broader than high, the outer lip rather flattened above and swollen below, columella slanting, little reflected, a thin glaze connecting across body whorl. Coloration pale brown with faint flammules of red brown which generally disappear on the body whorl though sometimes notable in the juvenile stages. Whorls four, apical whorls smooth but sculpture develops on the second as very fine radials, which are succeeded by concentric lines, later forming with the radials a fine subnodulose sculpture. On the penultimate whorls about ten lines can be counted and the fine nodules appear as lozenges: on the last whorl the concentric lines regularly become obsolete so that the reticulation is very faint near the aperture. On the under surface the concentric lines are fairly regular, and the radials obsolete while both become indistinct near the aperture. Breadth 10 mm., height 7 mm. Type locality Hummock I.

One adult and three immature shells from Pearson I. are more boldly colored, the flames being very noticeable, and the reticulation is much more marked so may be called *D. p. flagrans* subsp. nov.

Family **Charopidae.**

This family includes small shells with a rather distinct radial sculpture, flattened appearance, more tightly coiled than the preceding. It is difficult to indicate anything very striking in their appearance by words, yet the student very soon recognises their affinity at sight. They may be termed helicoid, but not conical, commonly discoidal, even with the spire concave, varying from imperforate to very widely umbilicate, the sculpture of varying strength, but radials always present.

Key to Genera.

Shell with spire roundly elevated, umbilicus scarcely open, apex smooth, sculpture medium *Elsothera.*

Shell with spire planate, umbilicus very wide, apex large, apparently smooth, sculpture fine. *Discocharopa.*

Shell with spire planate, umbilicus very wide, apex very large, concentrically boldly striate, sculpture fine. *Roblinella.*

Shell with spire concave, umbilicus narrow, deep, apex almost smooth (obsoletely concentrically striate) sculpture fine *Pillomena.*

Genus **Elsothera.**

1933. *Elsothera* Iredale, Rec. Austr. Mus., Vol. XIX, p.53, Aug. 2.

Orthotype *Helix sericatula* Pfeiffer.

The type has the umbilicus almost closed, and the sculpture is fine, the form of the shell a subglobose discoidal. The South Australian forms have generally the umbilicus more open, and sometimes the sculpture a little bolder, but they appear congeneric, the apex apparently smooth.

Key to Species.

Shell flattened globose, discoidal, umbilicus well marked but not wide, the sculpture rather bold on the earlier whorls *murrayana.*

Shell flattened, of similar form but the sculpture much finer and regular, umbilicus narrower; major diameter 5.5 mm., minor diameter 4.75 mm., height 3 mm. *nesana.*

Shell a little more elevated, umbilicus narrow, the sculpture regular *reteporoides.*

Elsothera murrayana.

1864. *Helix murrayana* Pfeiffer, Proc. Zool. Soc. (Lond.), 1863, p.527, (ex Angas, p.521, n.n.) April 20 1864: Murray Cliffs, South Australia (Angas).

1868. *Helix murrayana* Cox, Mon. Austr. Land Shells, p.14, pl. XIX, fig. 10, May 6, from a painting of the type by Angas.

There are probably more species of these small snails as the few specimens available show differences but are not sufficient for complete diagnosis.

The Port Lincoln shells have the umbilicus narrower, and with the sculpture fine and regular, and thus recall *inusta* as much as *murrayana* and are here called *nesana.* Pl. I, fig. 14.

Elsothera reteporoides.

1887. *Helix reteporoides* Tate, Trans. Roy. Soc. South Austr., Vol. IX, 1886, p.62, pl. V, ff. 14a-c, March (separates distributed Dec. 29 1886). Black Hill near Adelaide, S.A.

Genus **Discocharopa.**

1913. *Discocharopa* Iredale, Proc. Mal. Soc. (Lond.), Vol. X, p.379, Sept.

Orthotype *Charopa exquisita* Iredale.

This Kermadec type was found living under stones rather deeply imbedded and under somewhat dry conditions. The Tasmanian *bassi* has been reported from similar situation, and conchologically it very closely agrees, while the Central *planorbulina* appears to come into this group.

Shell very small, flattened, discoidal, apex smooth, sculpture fine radials, umbilicus very wide, mouth without internal lamellae of any kind.

Discocharopa planorbulina. Pl. I, fig. 21.

1896. *Endodonta* (*Charopa*) *planorbulina* Tate, Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., p.187, pl. XVIII, fig. 3, February. Palm Creek, Krichauff Range, Central Australia.

Genus **Roblinella.**

1937. *Roblinella* Iredale, Austr. Zool., Vol. VIII, p.332, Mch. 12.

Orthotype *Helix roblini* Petterd.

This group was separated on account of its large protoconch, beautifully spirally striate: otherwise the shell resembles *Discocharopa* in conchological features. Indeed the species here recorded was referred to that genus until examined microscopically.

Roblinella speranda sp. nov. Pl. I, fig. 18.

Shell discoidal, spire flattened, last whorl scarcely descending, umbilicus very wide, lips thin, no teeth in aperture. Color cream. Apex of two whorls, ending in a varix, concentrically boldly striate, succeeding sculpture fine regular closely set radial ribs, about one hundred and eighty on the last whorl, the interstices finely striate. The type, from Adelaide, measures, major diameter 2 mm., height 1 mm.

Genus **Pillomena.**

1933. *Pillomena* Iredale, Rec. Austr. Mus., Vol. XIX, p.54, Aug. 2.

Orthotype *Flammulina meraca* Cox & Hedley.

This genus was proposed for a series of Charopid molluscs, with convex spire, although almost discoid, narrow umbilicus,

but apex concentrically striate. Although in my Basic List I classed *aemula* in this genus, the apex appears to be smooth or very finely radially striate, while the concave spire recalls *Geminoropa,* but that genus belongs to the damp forests of Tasmania.

Pillomena aemula. Pl. I, fig. 2.

1894. *Charopa aemula* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.192, November. Central Australia.

1896. Rep. Horn. Sci. Exped. Centr. Austr., pt. II, Zool., p.186, pl. XVII, fig. 2, February. Penny Springs, George Gills' Range.

Family **Stenopylidae.**

The strange little shell called *Planispira hemiclausa* by Tate (who admitted *Planispira* was a pen-slip for *Polygyra*) was transferred by Hedley to *Microphyura,* a genus introduced for a New Caledonian shell. Hedley examined a dried-up animal of the Central Australian species, and secured portions of a radula and jaw. Upon this he concluded "The structural details now given are not reconcilable with the accepted position of the genus (*Microphyura*) in Rhytididae, and I apprehend that it should correctly appear in the Endodontidae, intermediate between *Laoma* and *Flammulina.*" He also remarked "The genus (*Microphyura* and *hemiclausa*) would seem from its distribution and anatomy to be of high antiquity and of Antarctic origin. It is, perhaps, one of the most primitive of Australian snails."

I regard *Laoma* and *Flammulina* as representing two families separate from the Australian Charopids above reported as Endodontidae, and cannot see much conchological relationship with this species. The shell is of different formation while the mouth is very unlike any other in the supergroup Endodontidae, the thickening being of a different nature. Hence it must be regarded as of family value and its exact position is yet unknown.

Genus **Stenopylis.**

1914. *Stenopylis* Fulton, Ann. Mag. Nat. Hist., Ser. 8, Vol. XIX, p.163, August 1.
Orthotype *Planispira hemiclausa* Tate.

This little shell is flattened, discoidal, whorls rounded, mouth oblique, lips thickened, widely umbilicate. The generic name *Stenopylis* was introduced by Fulton, who distinguished it on account of the presence of two spiral laminae on the parietal wall. The sculpture also lacks the Endodontid radials.

Stenopylis hemiclausa. Pl. I, fig. 20.

1894. *Planispira hemiclausa* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.192, November. Central Australia.

1896. Rep. Horn. Sci. Exped. Cent. Austr., pt. II, Zool., p.185, pl. XVII, fig. I, February. Ilpilla Gorge, Spencer Gorge etc., C.A.

1896. *Microphyura hemiclausa* Hedley, id., ib., p.221, fig. C.

The distribution of this form is very peculiar as it appears to range along the Queensland coast and then in the interior.

Family **Microcystidae.**

The South Australian "Zonitids" are unknown anatomically, and therefore their relationships are problematical. In the meanwhile the few species are alloted to the Microcystidae with doubt as two families may even be represented.

Genus **Echonitor** nov.

Type *Thalassia cyrtochila* Gude.

Gude later introduced *Nitor* to replace *Thalassia*, the type being given as *subrugata* Reeve, an Oxleyan form. As the shell of *cyrtochila* differs in form completely from *Nitor*, a name is necessary until the animals are examined. In shell characters the South Australian shell is more like the Queensland Microcystids such as *rustica* with which it was long confused. The shell is depressedly subglobose, thin, glossy but not shining, whorls few, well rounded, sutures a little impressed, apical whorls smooth, umbilicus minute, hidden by the reflected columella.

Echonitor cyrtochilus.

1905. *Thalassia cyrtochila* Gude, Journ, Malac. Vol. XII, p.12, pl. III, fig. 2, a.b. April 7. Long Reef, South Australia.

A cotype is golden brown, and Gude wrote "very finely arcuately striated, densely covered by excessively minute spiral lines." Under a strong lens these are not discernible so that the shell is smooth to all appearance.

Many specimens from various places disagree in color and form, being pale greenish and more conical, less globose. The umbilicus is more open, and as these are well known in collections under the name *euroxesta*, that is here used, the type locality being selected as Franklin Harbour, Eyre's Peninsula. The typical specimen measures 11.5 mm. in breadth by 8 mm. in height. Pl. I, fig. 19.

Echonitor albumenoideus. Pl. I, fig. 17.

1868. *Helix albumenoidea* Cox, Mon. Austr. Land Shells, p.11, pl. XII, fig. 2, May. Flinders Range, South Australia. Type in Australian Museum.

The original specimen is still available, and the figure and description are quite good. The milky appearance may not be normal, but it is smaller than the other named Australian species, and under a strong lens the earlier whorls show a faint regular concentric lining.

Echonitor waterhousei.

1868. *Helix waterhousei* Cox, Mon. Austr. Land Shells, p.3, pl. XIX, figs. 6, 6a, May, from a painting of the type by Angas, new name for

1864. *Helix* (*Thalassia*) *subangulata* Angas, Proc. Zool. Soc. (Lond.) 1863, p.521, April 20 1864, ex A. Adams and Angas MS. South Australia.

Not *Helix subangulata* Pfeiffer P.Z.S. 1854, p.53, Jan. 10, 1855.

The figure of the type shows a subangulate shell and this has not since been noted in South Australia so the record may be incorrect.

Genus Periclocystis nov.
Type *P. ardeni* nov. Pl. II, fig. 13.

Under the name "*Stenopus subangulatus* Ad. & Ang." I find masquerading a shell quite unlike the description and figure of Adams and Angas's species. It is quite unlike any other Microcystid, as, when adult, the outer lip has the edges thickened, and the columella thickened but not reflected, especially with the mouth descending. Similar shells are named "*ardeni* Brazier," but that name has never been published before.

Shell small, of few whorls, dull, greyish, flattened, sculpture of rather coarse growth lines, umbilicus open, narrow, mouth descending, somewhat oblique, edges thickened, columella very small, thick, not reflected.

The sutures are shallow, the whorls slightly convex, the periphery does show a subangulation, the under surface also little convex: the apical whorls showing a faint concentric lining which soon disappears. The type is from Blinman and measures: major diameter 8 mm., minor diameter 7 mm., height 3.5 mm.

Family Hadridae.

Hereunder are placed the shells previously regarded as *Badistes* and *Thersites*. It is not definite that these are closely related to the shells hitherto classed as *Badistes* and *Thersites*, but conchologically they recall those groups, and until we know more about the anatomy of these molluscs they may remain here.

Then owing to the relationship of the anatomy are placed here many shells smaller and generally unlike in appearance for which I had provided the genera Semotrachia and Vidumelon.

Hedley separated "*Thersites*" from "*Xanthomelon*" by means of the generative system, but his alliances by this criterion appear very unnatural, and the conchological features deserve more consideration, a conclusion Hedley himself later reached. For the present however *Semotrachia* may be placed here, while the extraordinary *Vidumelon* gives no clue, but on account of the apertural formation it may be more closely related to this family than the next. Another genus of difficult location is *Cupedora* which is conchologically similar to *Meracomelon*, so much so that the members have been commonly confused, yet in some ways it recalls some of the aberrant members of *Pleuroxia*, which is supposed to belong to the other family.

Key to Genera.

Shell almost imperforate, helicoid, thin, granulose throughout *Exilibadistes*.

Shell umbilicate, flattened helicoid, granulose generally, coloration banded *Meracomelon*.

Shell similar in shape to members of the preceding genera, but with coarse radial plicae, and scattered granulation and earlier whorls sub-keeled with an ante-peripheral depression *Cupedora*.

Shell small, subdiscoidal, surface more or less granulose, mouth oblique, with expanded lips and almost free with a constriction behind the lip and generally a wide umbilicus *Semotrachia*.

Shell flattened, rounded whorls, subdiscoidal, many whorled, umbilicus very narrow, mouth elongate, edges reflected *Vidumelon*.

Genus Exilibadistes.

1933. *Exilibadistes* Iredale, Rec. Austr. Mus., Vol. XIX, p.52, August 2.

Orthotype *Helix bednalli* Brazier=*Helix sutilosa* Deshayes.

Shell very similar to that of *jervisensis* Quoy and Gaimard, the "type" of "*Badistes*," in general appearance so that Des-

hayes' name was even sunk as a synonym, but the South Australian shell was separated as distinct under the name *bednalli* Brazier. A superficial granose sculpture distinguishes the latter, and is here used as a generic feature until the anatomy is well known.

Exilibadistes sutilosa. Pl. I, fig. 13.

1850. *Helix sutilosa* Deshayes, Hist. Nat. Moll. Terr. (Ferussac), Vol. I, p.203, (pl. 17A, ff. 18-19, livr. 29, 1829), ex Ferussac, Tabl. Syst., p.47, Jan: p.43, June 1921. *nomen nudum* Isles St. Pierre & St. Francois, South Australia (Peron).

1872. *Helix bednalli* Brazier, Proc. Zool. Soc. (Lond.), 1871, p.641, May 2 1872. Near Adelaide, South Australia.

No specimens from the small islands are available, but Kangaroo Island shells are regarded as conspecific tentatively, and these differ from the mainland ones in being smaller, rougher, and having the umbilicus still maintained as a chink, whereas the columella is reflected over and appressed in Adelaide examples. Consequently the two names may be utilised in subspecific sense.

Genus **Meracomelon.**

1933. *Meracomelon* Iredale, Rec. Austr. Mus., Vol. XIX, p.52, August 2.

Orthotype *Helix rufofasciata* Brazier.

Medium sized, 15-30 mm., shells, flattened helicoid, with the periphery keeled sometimes in the juvenile but very rarely in the adult stage, texture thin, coloration generally banded, sculpture subgranulose, umbilicus small, open, columella reflected, outer lip usually thin.

The series of shells classed under this genus is very complex, many species having been named and there are apparently more, but the differences are slight and may be regarded as of representative value only.

Key to Species.

Shell large, 25 mm., whorls rounded, spire a little elevated, umbilicus narrow, sculpture granulose *rufofasciatum.*

Shell smaller, 20 mm., spire less elevated, umbilicus more open, sculpture more strongly granulose *extensum.*

Shell larger, 30 mm., more globose, and more granulose than *rufofasciatum,* mouth more open but umbilicus hidden by columellar reflection *loriolianum.*

Shell similar but more depressed, sculpture of granules almost obsolete *subloriolianum*·

Shell small, 15 mm., more elevated than typical species, sculpture coarsely granulose *broughami*.

Shell large, 25 mm., more globose, notably granulose throughout, umbilicus almost hidden *cassandra*.

Shell smaller, 20 mm., less globose, still granulose, base smoother, umbilicus more open, thin, white, *moorundianum*.

Shell strongly keeled in the juvenile stage, under 25 mm., last last whorl rounded, mouth open, umbilicus hidden *meridionale*.

Shell strongly keeled in adult, over 25 mm., flattened, umbilicus narrow; sometimes developing a rounded periphery *suspectum*.

Shell strongly keeled in adult, smaller, under 25 mm., flattened, umbilicus comparatively wide, not hidden by columellar reflection, outer lip thickened and reflected *howardi*.

Shell small, rounded, similar to *moorundiana*, but more solid, about 20 mm., umbilicus narrower, banded *stutchburyi*.

Shell very small, thin, subconical, subkeeled, uniform brown, wavy ribs, granulose, umbilicus narrow *luteofuscum*.

Meracomelon rufofasciatum.

1875. *Helix* (*Hadra*) *rufofasciata* Brazier, Proc. Linn. Soc. N.S.W., Vol. I, p.17, April 27. Yardea, 360 miles north of Adelaide, South Australia.

Yardea, as far as I can find, is in the Gawler Ranges, and the true *rufofasciatum* must be close to the Port Lincoln *broughami*, and definitely not conspecific with *subloriolianum*, which has been synonymised with it.

The type of *rufofasciatum* is in the Australian Museum, and is notably granose as pointed out in the description, and the locality is confirmed by a specimen collected by Mr. Slater Dowell at Mt. Yardea, Gawler Ranges, which shows the same sculpture. Although very similar in form, *subloriolianа* lacks this distinct granose sculpture.

Meracomelon sublorioliana.

1890. *Helix sublorioliana* Pilsbry, Man. Conch., (Tryon) 2nd Ser., Vol. VI, p.147, pl. 58, figs. 10-12, December 16. Flinders Range, South Australia.

Though Pilsbry's species has been regarded as the same as the preceding, the localities are widely separated and in this group geographical variation is very pronounced. From Carrieton a series of smaller shells with the spire less elevated, the umbilicus more open, and a beautiful distinct granulose sculpture is seen, and this extends across into New South Wales. A specimen similar was collected many years ago in the Maldigo Hills by (Sir) D. Mawson. This smaller elevated form may be called *M.s. extensum* subsp. nov. Pl. I, fig. 7.

Meracomelon loriolianum.

1863. *Helix lorioliana* Crosse, Journ. de Conch., Vol. XI, p.273, pl. IX, fig. 6, July 1. Mountains behind Spencer Gulf, South Australia.

Meracomelon broughami.

1875. *Helix broughami* Angas, Proc. Zool. Soc. (Lond.), 1875, p.389, pl. XLV, ff. 4, 4a, Oct. 1. Port Lincoln, South Australia.

Meracomelon cassandra.

1864. *Helix cassandra* Pfeiffer, Proc. Zool. Soc. (Lond.), 1863, p.527, April 20 1864. Murray Cliffs, South Australia. Figd. Cox, Mon. Austr, Land Shells, p.50, pl. XIX, fig. 8, May 1868 (type figured by Angas).

In collections a smaller thin whitish shell sometimes very faintly banded, granulose above, smoother below, with the umbilicus more open bears the name *moorundiana* Tate with locality Tailem Bend. It seems distinct from *cassandra* and I have seen a published figure bearing the name, but the source of the illustration has not yet been traced. Pl. I, fig. 28.

Meracomelon meridionale.

1903. *Thersites* (*Badistes*) *meridionalis* Gude, Proc. Mal. Soc. (Lond.), Vol. V, p.262, pl. VII, figs. 5-7, April. South Australia.

A series apparently named through Gude's influence are of medium size, up to 25 mm., with the spire flattened, the last whorl with the periphery rounded, the mouth open, the umbilicus narrow and half hidden have the juveniles strongly keeled.

From near Blinman, east of the Flinders Range, a larger shell, very flattened, with the keel permanently retained over 25 mm. in width, has the umbilicus narrow, but hidden by the reflected columella. The outer lip is thin and it is thus distinguished from the true *howardi*: the larger shell is here named *M. meridionale suspectum* subsp. nov. No locality was given by Gude, and only "near Blinman" for many shells of the present form, which seem to intergrade, while the most extreme form is labelled Parachilna, and this might be fixed as the type locality. Pl. I, fig. 27. Gude's measurements are 28 mm., by 23.5 mm., by 16.5 mm.

Meracomelon stutchburyi.

1857. *Helix stutchburyi* Pfeiffer, Proc. Zool. Soc. (Lond.), 1856, p.386, May 8 1857. "Drayton Range, North Australia (Mr. Stutchbury)," error=Port Elliott, South Australia.

In the Proc. Zool. Soc. (Lond.), 1863, p.520, Apl. 20 1864, Angas wrote "*Helix* (*Hadra*) *stutchburyi* Pfr. A somewhat thin, pale straw-coloured shell with a faint band, intermediate between *H. cassandra* and *H. gilberti* of New South Wales. From the scrubs near Port Elliott." This was continued in his 1876 list (Journ. Conch. (Leeds), Vol. I, p.135), and shells from Port Elliott are before me. These are dead but show the characteristic banding and agree well with Pfeiffer's description. No shell has yet been found in Queensland in agreement, so that it appears that an error in locality was made. In the same paper Pfeiffer described *Helix ductilis, H. delta,* and *H. pliculosa* from the same locality, and *H. adelaidae* from Adelaide. The lastnamed is rejected as not being South Australian, and of the other three, only one, *delta,* has been recognised from Queensland.

Meracomelon luteofuscum.

1868. *Helix luteofusca* Cox, Mon. Austr. Land Shells, p.52, pl. XII, fig. 1, 1a, May. Flinders Range, South Australia (Masters).

This shell, of which the topotypes, including the type, are in the Australian Museum, is a small somewhat aberrant associate of the *Meracomelon* series. It is much smaller, very thin, subconical, umbilicus narrow, deep not hidden by the slightly reflected columella, lips thin, subkeeled, with a sculpture of irregular wavy ribs overridden by a very fine granulation which persists on the apex. As it is not well understood, a new subgenus, *Findomelon,* is proposed, so that further study may be made. It is also uniform golden brown in coloration thus contrasting notably with the typical banded *Meracomelon.*

Meracomelon howardi.

1869. *Helix* (?*Plectotropis*) *howardi* Angas, Proc. Zool. Soc. (Lond.), p.48, pl. II, fig. 9, June 21. Arrowie, 450 miles north of Adelaide, South Australia.

A topotype agrees in size and particulars with the description and figure, and the strongly expanded lips differentiate this from all the other species of the genus, so that a new sub-generic name *Contramelon* is introduced. The keel is very pronounced and the umbilicus is comparatively wide for this series. Although the coloration recalls the *Meracomelon* series the mouth formation strongly suggests relationship with typical *Semotrachia.* I have since noted that Cotton and Godfrey (South Austr. Nat., Vol. XIII, p.175, Aug. 1932) had placed this species under *Glyptorhagada.* Specimens so named from Angorichina, from the South Australian Museum, belong to *Meracomelon meridionale suspectum* ante, and are larger, with coarser sculpture, umbilicus more closed and mouth with discontinuous lips though the edge shows thickening.

Genus Cupedora.

1933. *Cupedora* Iredale, Rec. Austr. Mus., Vol. XIX, p.48, August 2.

Orthotype *Helix lincolniensis* Pfeiffer.

This generic name was introduced for a species, which had been allotted to genera belonging to distinct families, and at present it appears to belong to the *Meracomelon* series rather than to the Rhytidoid group. It differs in the peculiar sculpture, unlike that of *Meracomelon,* but its general form is similar, save that in the immature there is a notable anteperipheral depression. It appears that *lincolniensis* develops into the species known as *patruelis* and that *evandaleana* is the northern representative.

Key to Species.

Shell helicoid, whorls rounded, earlier whorls keeled showing an anteperipheral groove, sculpture of coarse radials with scant granules scattered, umbilicus hidden by reflected columella in adult *patruelis=lincolniensis.*

Shell similar to juvenile above as this species does not seem to develop into a shell corresponding to the preceding adult *evandaleana.*

Shell with spire a little elevated, anteperipheral groove present, sculpture of wavy lines weak overrun by coarse granulation *tomsetti.*

Cupedora patruelis. Pl. I, fig. 3.

1864. *Helix (Hadra) patruelis* Angas, Proc. Zool. Soc. (Lond.), 1863, p.520, April 20 1864, ex A. Adams & Angas MS. Port Lincoln, South Australia.

Figd. Cox, Mon. Austr. Land Shells, p.49, pl. III, fig. 8, May 1868.

1864. *Helix lincolniensis* Pfeiffer, Proc. Zool. Soc. (Lond.), 1863, p.527, Apl. 20 1864. Port Lincoln, South Australia.

Figd. Cox, Mon. Austr. Land Shells, p.51, pl. VI, fig. 9, May 1868.

Comparison of specimens suggests that *lincolniensis* was based on a juvenile of the shell simultaneously named *patruelis* by Angas. The peculiar sculpture and form is the same, and the young shells of *patruelis* are inseparable from the so-called *lincolniensis*.

Cox wrote "Two specimens from Flinders Island are of a smaller variety; but there can be no doubt as to specific identity, for one shows very plainly, not merely, in addition to similarity of sculpturing, etc., the pale patch on the lower surface, but also the spiral band below the suture."

Specimens from Thistle Island also belong to this species but whether subspecific differentiation has taken place cannot be determined from the material available.

Cupedora evandaleana.

1864. *Helix evandaleana* Pfeiffer, Proc. Zool. Soc. (Lond.), 1863, p.528, April 20 1864. Evandale, South Australia.

Figd. Cox, Mon. Austr. Land Shells, p.51, pl. IX, fig. 18, May 1868.

1878. *Helix induta* Tate, Proc. Linn. Soc. N.S.W., Vol. II, p.290, June. Kaiserstuhl, South Australia.

Not *Helix induta* Pfeiffer, P.Z.S., 1845, p.128, Feb. 1846.

Although Tate's *induta* has been placed as a synonym the description does not seem to apply to this shell at all, so the type should be re-examined. Tate's name is invalid, so a new name must be provided if the species needs reinstatement.

Cupedora tomsetti.

1887. *Helix tomsetti* Tate, Trans. Roy. Soc. South Austr., Vol. IX, 1886, p.63, pl. V, figs. 13 a c, March 1887. Cape Borda, Kangaroo Island, South Australia.

Genus **Semotrachia.**

1933. *Semotrachia* Iredale, Rec. Austr. Mus., Vol. XIX, p.51, August 2.

Orthotype *Thersites basedowi* Hedley.

1933. *Catellotrachia* Iredale, Rec. Austr. Mus., Vol. XIX, p.52, August 2.

Orthotype *Hadra winneckeana* Tate.

1933. *Spernachloritis* Iredale, Rec. Austr. Mus., Vol. XIX, p.52, August 2.

Orthotype *Hadra setigera* Tate.

These shells are small, subdiscoidal, surface granulated, sutures impressed, mouth oblique, facing rather downwards, practically free, the lip expanded and continuous, with a constriction behind the lip and sometimes bearing hairs. The typical form is almost smooth and rather flattened, subkeeled and apparently non-setigerous.

In *Catellotrachia* the mouth is almost free, the form is more rounded, non-keeled, the granulations coarser and no hairs have been seen although reported by the author of the type species. In *Spernachloritis* the granulations bear hairs after the manner of "*Chloritis*" although otherwise the shell is formed very similarly to the preceding. Another subgroup, which must be named *Dirutrachia* subgen. nov., is subkeeled, granulose throughout and apparently nonsetigerous but with a narrow umbilicus and a large basal tubercle in the aperture, *sublevata* being the type.

Key to Species.

Shell discoidal, flattened, subkeeled, sculpture of granules, umbilicus wide, mouth free, lips reflected *basedowi.*

Shell similar, less keeled, umbilicus narrower, mouth not free, lips not continuous, apex smooth *mannensis.*

Shell very small, under 10 mm., almost smooth, no hairs noticed, umbilicus wide, mouth free, no basal tubercle, whorls not keeled *winneckeana.*

Shell very similar, a little larger, up to 10 mm., ribs granulose, but no hairs noted, apex granular, umbilicus very wide, mouth free *euzyga.*

Shell similar, large over 10 mm., regular growth of hairs, subgranulose sculpture, umbilicus very wide, mouth free. lips not continuous *setigera.*

Shell generally agreeing but smaller, only 8 mm., and notably more densely hairy, more elevated with the mouth continuous *esau.*

Shell flattened, subkeeled, finely granulose, umbilicus narrow, mouth oblique with a large basal tubercle *sublevata.*

Shell generally agreeing, smaller, less keeled, tubercle more prominent *mersa.*

The following are aberrant and may require removal.

Shell more elevated, but easily distinguished by its peculiar granulose sculpture *papillosa.*

Shell very similar to *basedowi* but with the spire more elevated; requires reinvestigation *subsecta.*

Shell flattened, subdiscoidal, umbilicus very wide, mouth almost normal, lips scarcely thickened, sculpture of very fine radials only *eyrei.*

Semotrachia basedowi.

1905. *Thersites basedowi* Hedley, Trans. Roy. Soc. South Austr., Vol. XXIX, p.161, pl. XXX, ff. 1-3, December. Musgrave Ranges, Central Australia.

At the place cited Hedley pointed out that a specimen from the Mann Range was "regarded for the present as a variety." It is here named *S.b. mannensis* subsp. nov., as it is smaller, less keeled, the umbilicus narrower, the mouth not free, the lips not continuous and the apex smooth. Pl. II, fig. 18.

Semotrachia winneckeana.

1894. *Hadra winneckeana* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.194, November. Central Australia.

1896. *Angasella winneckeana* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.191, pl. XVIII, fig. 8, February. Spencer Gorge, by Brinkley Bluff.

Tate wrote "is similar to *euzyga* except in dimensions in the sparsely developed setae and the finer and closer sculpture." No shell examined shows any setae.

Semotrachia euzyga.

1894. *Hadra euzyga* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.194, November. Central Australia.

1896. *Angasella euzyga* Tate, Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., p.190, pl. XVII, fig. 7, February. Alice Springs, Central Australia.

Superficially only a larger relative of *winneckeana,* appearing to agree in every essential feature, but Tate wrote "might be regarded as a dwarf state, (of *setigera*), but the flat shape, the more deflected aperture, and fewer rows of bristles render the separation easy."

No specimen available shows any bristles.

Semotrachia setigera.

1894. *Hadra setigera* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.194, November. Central Australia.

1896. *Angasella setigera* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.189, pl. XVII, fig. 6, February. MacDonnell Range, Central Australia.

1896. (*Angasella*) *larapinta* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.190, Feb., new name only.

Apparently the shells lumped under this name were collected at many localities as two distinct species appear among them. One of these is the larger shell described by Tate, with rather distant rows of hairs, and a smaller one with shorter hairs crowded and not arranged in separate rows. These smaller shells are more elevated with the mouth continuous, and I name this, *Semotrachia esau* sp. nov., the type locality being selected as the Krickaueff Range. Pl. I, fig. 11. Major diameter 8.5 mm.; minor diameter 7 mm.; height 4.5 mm.

Semotrachia sublevata.

1894. *Hadra sublevata* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.192, November. Central Australia.

1896. *Thersites sublevata* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.196, pl. XVII, fig. 5, February. Hart Ranges, Central Australia.

Semotrachia mersa sp. nov. Pl. II, fig. 9.

1905. *Xanthomelon sublevatum* Hedley, Trans. Roy. Soc. South Austr., Vol. XXIX, p.162, pl. XXX, figs. 7, 8-9, December. Musgrave Ranges, Cent. Austr.

Hedley stated "As the figure quoted is unsatisfactory, others are now presented." The typical specimens from the Hart Ranges are less elevated than these figures of Hedley, which are excellent, and especially differ in the formation of the basal tooth which is broader and less conical.

Semotrachia papillosa.

1894. *Hadra papillosa* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.194, November. Central Australia.

1896. *Angasella papillosa* Tate, Rep. Horn. Sci. Exped. Cent. Austr., pt. II, Zool., p.191, pl. XVIII, fig. 9, February. No locality ex Rev. H. Kempe: probably MacDonnell Ranges.

This conical shell appears to be unknown save from the examples described by Tate, and the figure is not too good, but it may be recognised by its form and granulose sculpture.

Semotrachia subsecta.

1879. *Helix subsecta* Tate, Trans. Proc. Phil. Soc. Adelaide, South Austr., 1878-9, p.133, pl. V, ff.2.a b, after Oct. Port Wakefield, South Australia (Mrs. Kreusler).

This shell appears to resemble *basedowi* but with a little more elevated spire but the locality seems incongruous. Perhaps it was only sent, not collected, from Port Wakefield.

Semotrachia eyrei.

1876. *Helix eyrei* H. Adams and Angas, Proc. Zool. Soc. (Lond.), 1876, p.489, pl. XLVII, figs. 10-12, Oct. 1. Shores of Lake Eyre, Central Australia.

1877. *Helix eyrensis* Martens, Zool. Record, 1876, Moll. p.44, emendation only.

With flattened top and wider umbilicus, the mouth less oblique and open, this species stands somewhat apart especially as the sculpture has become obsolete. It may not be closely allied to any other species but appears to be common in the type locality. Specimens have been collected as far south as Mt. Lyndhurst but otherwise it appears to be restricted to the shores of Lake Eyre. It may be given the new subgeneric name, *Lacustrelix,* as it is anomalous however it is judged.

Genus **Vidumelon.**

1933. *Vidumelon* Iredale, Rec. Austr. Mus., Vol. XIX, p.51, August 2.
Orthotype *Hadra wattii* Tate.

This curious shell cannot be easily placed in either family, the Hadridae or the Xanthomelontidae, from conchological characters as these are dissimilar from either. The shell is subdiscoidal, spire very little elevated, whorls numerous, umbilicus very narrow but not hidden by the columella, mouth elongate much wider than deep, basal faintly tuberculate, mouth edge reflected, sculpture of fine slanting striae, periphery rounded.

Vidumelon wattii. Pl. II, fig. 6.

1894. *Hadra wattii* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.192, November. Central Australia.

1896. *Thersites* (*Badistes?*) *wattii* Tate, Rep. Horn. Sci. Exped. Cent. Austr., pt. II, Zool., pl. XVIII, fig. 12, February. Maude River, Hart Ranges C.A.

Family **Xanthomelontidae.**

Hedley dissected some of these Centralian snails, and found that by means of the generative organs he could separate two large series, the one including the *Thersites, Chloritis, Papuina* and *Planispira* series as contrasted with *Xanthomelon* in which he included the globose forms I have called *Sinumelon,* and also *Angasella* and *Glyptorhagada.* However he distinguished some of the similarly formed shells as covering "Thersitoid" animals, e.g. *setigera.* The latter recall the *Planispira* series conchologically as well as the Chloritid one, so have been allotted to the previous family, but these allocations must be regarded as tentative.

Key to Genera.

Shell globose, sometimes a little flattened, umbilicus narrow or even closed, sculpture indefinite plicae. *Sinumelon.*

Shell with spire elevated, subglobose, mouth circular, practically free, sculpture strongly granose. *Granulomelon.*

Shell flattened, umbilicate, mouth oblique, sculpture strong radial ribbing, umbilicus typically wide *Pleuroxia.*

Shell elevated, spire straight-sided, very narrowly umbilicate, mouth circular, almost free, edges flaring, columella triangularly reflected, sculpture granulose *Basedowena.*

Shell flattened or elevated, narrowly umbilicate, but sometimes widely comparatively, sculpture even stronger radially ribbing than *Pleuroxia,* but sometimes granulose *Glyptorhagada.*

Shell very flattened, strongly keeled, many whorled, with minute umbilicus and thickened lips, mouth rather oblique *Divellomelon.*

Genus **Sinumelon.**

1930. *Sinumelon* Iredale, Vict. Naturalist, Vol. XLVII, p.120, November.

Haplotype *Helix nullarborica* Tate.

1932. *Notobadistes* Cotton and Godfrey, South Austr. Naturalist, Vol. XIII, pp.169-170, "August"=September 30.

Orthotype *Helix bitaeniata* Cox=*flindersi* Angas.

Small to medium-sized globose shells with indefinite sculpture, and generally small umbilicus, more or less hidden by the reflected columella, the outer lip also reflected. The apical whorls

are apparently smooth, but sometimes show a faint granose sculpture. The latest results tend to show that there are two distinct series occurring together and that to this fact is due the confusion which is not completely dispelled in this essay, but the way is cleared a little. The indications suggest that *Notobadistes* will be used for the *flindersi* group and that *Sinumelon* will include the remainder, though still further subdivision may be necessary.

Key to Species.

Shell globose, perhaps white, sculpture of rough radials, the shell dented, spire a little elevated, umbilicus narrow, open, columella thickened, lips thickened *nullarboricum.*

Shell globose, spire short, sculpture strongly decussate, green, umbilicus narrow, hidden by columella *bednalli.*

Shell flattened globose, spire little elevated, banded brown and fawn, width greater than height, sculpture very fine, umbilicus narrow but open, surrounded by a feeble ridge, lips of mouth notably reflected *godfreyi.*

Shell similar in shape and coloration but much larger, the last whorl similarly expanded, the umbilicus still open, sculpture still fine *eupesum.*

Shell similar in form and color but much smaller and last whorl more expanded, umbilicus wider *expositum.*

Shell smaller, similarly broad, brownish with indistinct bands, upper surface irregularly plicate finely, mouth still with lips expanded and umbilicus open *fodinale.*

Shell still smaller, but similarly colored, spire a little elevated, sculpture a little coarser, umbilicus a little wider *serlense.*

Shell more elevated, globose, banded red and white, stronger radial sculpture, umbilicus nearly closed by reflected columella, lips of mouth not as strongly expanded as preceding *flindersi.*

Shell similar but a little more flattened, of same coloration, sculpture a little fainter, umbilicus nearly closed *petum.*

Shell still elevated, of different coloration, dull brown, paler around umbilicus, umbilicus nearly closed, sculpture irregular *aversum.*

Shell similar in shape but much larger, last whorl a little more inflated, coloration uniformly green, sculpture delicate radial plicae, sometimes decussate, umbilicus narrow, sometimes completely closed by reflected columella *perinflatum.*

Shell a little broader, no decussation, umbilicus as chink only, spire somewhat conical *impletum.*

Shell not so broad, without any decussation, umbilicus closed by appressed columella, green, lips not as expanded as in preceding *pedasum.*

Shell large, spire more obtuse, greenish with an indistinct peripheral band, umbilical chink present, a feeble radial subordinate sculpture present, but no decussation *remissum.*

Shell large, spire obtuse, similarly banded as the preceding, umbilical chink present, radial ribs present but accompanied by a granose sculpture *corinum.*

Shell very small, globose, thin, vitreous, deep green, ill defined radial ribbing, umbilicus almost hidden, outer lip not much reflected *pumilio.*

Sinumelon nullarboricum.

1879. *Helix nullarborica* Tate, Trans. Proc. Phil. Soc. Adelaide, South Austr., 1878-9, p.133, pl. VI, ff. 1,a b, ex 126 *nom. nud.* Bunda Plateau, Nullarbor Plain, South Australia.

Sinumelon bednalli.

1904. *Xanthomelon bednalli* Ponsonby, Proc. Mal. Soc. (Lond.), Vol. VI, p.182, fig. in text, September. MacDonnell Range, Central Australia.

This may be a local strongly decussated relation of the widely spread "*perinflata*" group, because any large inflated *Sinumelon* from the interior has been called *perinflata.* Ponsonby compared it with *grandituberculata* Tate, with which it has little affinity. It should be noted that Pfeiffer's *perinflata* was described as "decussated," and his specimen was from the MacDonnell Range so that *bednalli* may be a synonym of the true *perinflata.*

Sinumelon godfreyi.

1933. *Sinumelon godfreyi* Iredale, Rec. Aust. Mus., Vol. XIX, p.52, August 2, new name for

1862. *Helix angasiana* Pfeiffer, Journ. de Conch., Vol. X, p.228, p.X, fig. 2, July 1. Near Lake Torrens, South Australia. Refigd. Angas, Proc. Zool. Soc. (Lond.), 1876, p.268, pl. XX, figs. 13, 14.

Not *Helix angasiana* Newcombe May 1860.

In the Journ. Conch. (Leeds), Vol. I, p.135, 1876, Angas gives the exact locality of *angasiana* as "Arrowie, near Lake Torrens." A paratopotype from the Angas collection is in the Australian Museum.

A specimen from Charlotte Waters is similar but smaller with the last whorl more expanded, the umbilicus wider and is here named *expositum* nov. Pl. II, fig. 22, as it tends to connect typical *godfreyi* in range with the Central Australian series.

Sinumelon fodinale.

1892. *Helix* (*Hadra*) *fodinalis* Bednall, Trans. Roy. Soc. South Austr., Vol. XVI, p.63, pl. I, figs. 1, a c, December, ex Tate MS. Wankaringa, South Australia.

Tate reported that this was the most widely spread and abundant snail met with by the Horn Scientific Expedition, and then gave tables of variation and discussion on sculpture, neglecting entirely the details of the distribution which might have solved his troubles. As the true *fodinalis* appears to be a small relative of *godfreyi,* it does not seem to be possible for it to exist in the interior and no specimens have been seen from Centralia that would be classed under this species strictly speaking. The true *fodinalis* appears to spread eastward, a form being found inside the New South Wales border.

From Mt. Serle a smaller form with a wider umbilicus agrees in detail with *fodinalis,* the sculpture being a little coarser, and the spire generally a little more elevated. This may be called *S. fodinale serlense* subsp. nov. Pl. II, fig. 12.

Sinumelon flindersi.

1864. *Helix* (*Hadra*) *flindersi* Angas, Proc. Zool. Soc. (Lond.), 1863, p.521, April 20 1864, ex A. Adams & Angas MS. Tillowie, near western slopes of Flinders Range, South Australia.

Figd. Cox, Mon. Austr. Land Shells, p.51, pl. XX, fig. 11, May 1868 (type figured by Angas).

1868. *Helix bitaeniata* Cox, Mon. Austr. Land Shells, p.50, pl. IV, fig. 9, May. Port Augusta, South Australia (Masters).

Refigd. Angas, Proc. Zool. Soc. (Lond.), 1876, p.268, pl. XX, figs. 15, 16 (Masters).

This form is an erect globose shell whereas *godfreyi* is a flattened globose type, in the former case the umbilicus being nearly covered, in the latter notably open, the mouth also expand-

ed. These may prove to be representative of distinct groups as they live side by side in some localities.

A series from Mt. Yardea, Gawler Range, are a little more flattened, though of the some coloration, the sculpture not quite so pronounced, and the umbilicus nearly closed: for these the new name *petum* is introduced. Pl. II, fig. 14.

Sinumelon aversum sp. nov. Pl. II, fig. 15.

This well defined species from Blinman, Flinders Range, has been confused with *godfreyi*, and then *fodinalis*, but it is related to neither, and is more like *flindersi*, only of a different color scheme. It is a little more depressed than typical *flindersi*, more solid, sculpture more irregular, the ribbing imperfect and not clear cut, the coloration very different. The shell is a dull brown, paler around the umbilicus, the reflected columella almost closing that aperture. Width 18 mm., height 15 mm.

Sinumelon perinflatum.

1864. *Helix perinflata* Pfeiffer, Proc. Zool. Soc. (Lond.), 1863, p.528, April 20 1864, ex Angas, p.520, *nomen nudum*. MacDonnell Ranges, Central Australia (Waterhouse).

Figd. Cox, Mon. Austr. Land Shells, p.45, pl. XX, fig. 2, May 1868 (type figured by Angas).

Angas' figure does not portray the shell described by Pfeiffer, as it lacks the inflated appearance and also disagrees with the description, the altitude in the figure being greater than the width, while the measurements read: "Diameter, greatest 23.5 mm., least 20 mm., height 20 mm." Specimens generally inflated have been collected at many places in the interior, and all called *perinflatum*. The material is not enough to name all the races, but the Birksgate Ranges shell may be called *impletum* nov. Pl. I, fig. 1. The shell is strongly inflated with about the measurements given by Pfeiffer, or a little broader, the spire short and conical, the sculpture fine irregular radials without any sign of decussation: the umbilicus shows as a narrow chink being nearly hidden by the reflected columella, body glaze marked. Shells, however, collected by Basedow and labelled Musgrave Ranges show a variation which may be a place variation, as they are taller, less inflated than the Birksgate Ranges form, green, with the umbilicus closed completely by the appression of the columellar reflection. There is no decussation and the growth stages are seen in darker markings. This may be called *pedasum* sp. nov. Pl. II, fig. 2.

With these, at the Musgrave Ranges, a number of larger, stouter shells, much inflated, but with the umbilicus still open, were collected and regarded as *perinflata*, but one living one was separated and recorded by Hedley as *angasianum*. This apparently belongs to the *godfreyi* series, but is the giant of that group and is named *eupesum* sp. nov. Pl. II, fig. 1. It is possible upon reconsideration that the Birksgate *impletum* may belong to this series rather than to the true *perinflatum* series. There appear to be four series, *perinflatum, godfreyi, flindersi* and *fodinale*, occurring together throughout South and Central Australia, and varying geographically so that it is difficult to determine dead shells without series. The coloration of living specimens is a good clue as *perinflatum* appears to be wholly green, *flindersi* banded with red and white, *godfreyi* greenish with a superior brown band and *fodinale*, brown rather darker above. The sculpture also varies slightly, *flindersi* being generally more rudely radially ribbed, while *godfreyi* has the finest striation, that can scarcely be called ribbing.

Bednall and Tate both include Wilson and Carrieton in connection with *perinflata* but specimens from those localities have a different appearance although recalling the Central species. The shells are large, subglobose, spire short but not pointed, greenish with an indistinct anteperipheral band, mouth large, subcircular, lips very little reflected. The columella is thickened and reflected over the very narrow umbilicus but a chink is left uncovered. The shell is roughened by crude unformed radials which are very irregular, scarcely meriting the title of ribs. The apex is practically smooth and there is no decussation.

Width 24 mm., height 23 mm. As this does not agree with any other form it is here named *remissum* nov., the type being a shell from Wilson. Pl. II, fig. 4.

Sinumelon pumilio sp. nov. Pl. II, fig. 11.

Bednall recorded from Mount Illbillie Soakage, Everard Range, under fig trees, at an elevation of 2000 feet, dwarf specimens with vitreous appearance. These appear to represent a distinct species especially as Bednall reported that one of the normal form (*perinflata*) was taken with them Shell very small for this genus, thin, vitreous, deep green, umbilicus almost covered by the reflected columella, subglobose, spire rounded, not as high as aperture. The sculpture consists of irregular radial ribbing, the ribs ill defined and broken, the apical whorls subgranulose, large, one and a half, the latter showing faint radials, three adult whorls. Mouth almost circular, outer lip slightly reflected. Breadth 15 mm., height 15 mm.

Bednall apparently figures *perinflata* from the same locality (Trans. Roy. Soc. South Austr., Vol. XVI, p.62, pl. I, fig. 6, Dec. 1892), noting that some of them are encircled with a somewhat broad rufous band just above the periphery, while others are not. He figures this banded form, and the figure shows a granose sculpture in addition to the usual rough radial ribbing. This granulation is not seen in other "*perinflata*" so the name *corinum* Pl. II, fig. 5 is provided for this species from the Everard Range, recorded as *perinflata*. The shell figured is a young living specimen showing this granulose sculpture.

Genus **Granulomelon**

1933. *Granulomelon* Iredale, Rec. Austr. Mus., Vol. XIX, p.51, August 2.
Orthotype *Hadra grandituberculata* Tate.

This extraordinary shell appears to be a somewhat uncoiled derivative of one of the *Sinumelon* series, such as *flindersi*, but in addition to this uncoiling and practical separation of the mouth a very regular granulation has developed. This close granulation over-runs the whole shell even the apical whorls being granulose, in *Sinumelon* the apex is smooth or faintly radially striate.

Granulomelon grandituberculatum Pl. II, fig. 16.

1894. *Hadra grandituberculata* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.193, November. Central Australia.
1896. *Thersites* (*Badistes*) *grandituberculata* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.200, pl. XVIII, fig. 11, February. Maude River, Hart Ranges, C.A.

Variation, which cannot be classed, occurs as some shells collected by Mr. T. Hodge-Smith, of the Australian Museum, at 20 miles south-west of Harding Springs, Hart Range, have the spire little elevated and look different from Tate's figures as well as topotypical specimens, but in detail otherwise agree.

Genus **Pleuroxia.**

1887. *Pleuroxia* Ancey, Conch. Exchange, Vol. II, pt. 3, p.38, September, new name for
1864. *Angasella* Angas, Proc. Zool. Soc. (Lond.), 1863, p.521, April 20 1864, ex A. Adams MS.
(Not *Angasiella* Crosse, Journ. de Conch., Vol. XII, p.50, January 1, 1864).

Haplotype *Helix cyrtopleura* Pfeiffer.

Shells small with spire flattened, depressedly subdiscoidal, with very wide umbilicus, radially coarsely ribbed, a subordinate grained sculpture. From this typical form the shell varies to an almost smooth or granulose shell and the umbilicus may become so small that it is hidden by the reflected columella. On the other hand it may become elevated so that specimens seem to intergrade with members of *Glyptorhagada.*

Key to Species.

Shell with spire depressed, discoidal, coarsely ribbed (say 45 in number) umbilicus very wide, mouth nearly free *cyrtopleura.*

Shell similar but smaller, surface granular as well as ribbed, umbilicus narrower *phillipsiana.*

Shell with spire flattened, coarsely granulosely ribbed irregularly, umbilicus narrow, mouth discontinuous *mawsoni.*

Shell with spire a little elevated, ribs very fine sloping many (say over 60) umbilicus narrower, mouth nearly free *polypleura.*

Shell with spire depressed, subkeeled, discoidal, ribs coarse (about 30) umbilicus wide, mouth large, free *arcigerens.*

Shell a little more elevated than the preceding one with ribs coarser, umbilicus narrower, mouth smaller, more rounded, free *oligopleura.*

Shell a little elevated, subdiscoidal, strong ribs (about 35) umbilicus narrow, mouth nearly free, lips thickened *radiata.*

Shell more depressed than *oligopleura,* costae more distant and regular, aperture more rounded *lemani.*

Shell small, subdiscoidal, ribs very fine, almost striae, narrow umbilicus, not hidden by columella *adcockiana.*

Shell similar, spire a little elevated, ribs coarser, umbilicus almost closed by reflected columella *truca.*

Shell small, spire a little elevated, ribs coarse, umbilicus open, narrow *everardensis.*

Shell with spire a little elevated, granulose throughout including apex, umbilicus medium, mouth open, lips very little thickened *squamulosa.*

Shell small, conical, spire elevated, ribs fine, umbilicus narrow, mouth open *wilpenensis.*

Shell a little larger, ribs much finer, umbilicus more closed, mouth more open . *musga.*

Shell more elevated, subglobose, ribs fine (about 50) granulose, umbilicus medium, mouth practically closed *hinsbyi.*

Shell with spire conical, ribs almost obsolete, umbilicus nearly closed, mouth almost continuous, edges expanded *elderi.*

Pleuroxia cyrtopleura.

1862. *Helix cyrtopleura* Pfeiffer, Journ. de Conch., Vol. X, p.227, pl. X, fig. 4, July 1. Near Lake Torrens, South Austr.

Pleuroxia phillipsiana.

1873. *Helix* (*Angasella*) *phillipsiana* Angas, Proc. Zool. Soc. (Lond.), 1873, p.183, pl. XX, fig. 4, June. Arrowie, interior of South Australia.

Pleuroxia mawsoni sp. nov. Pl. II, fig. 17.

A series of shells from "the Grampus Range—12 miles south of Paratoo on Broken Hill line beyond Petersburg" collected nearly forty years ago by (Sir) D. Mawson represent quite a new species. Shell subdiscoidal, top flattened, spire very little elevated, dead, chalky, whorls five, umbilicus narrow, deep, mouth with lips thin, columella only a little reflected. The apical whorls are granose, and this granulation develops into irregular wavy ribbing, which is ill defined and obsolete on the lower surface. It recalls *eyrei* in form but the sculpture differs as it does from the other *Pleuroxia.* Measurement of type: 18 mm. in breadth by 11 mm. in height.

Pleuroxia polypleura.

1899. *Angasella polypleura* Tate, Trans. Roy. Soc. South Austr., Vol. XXIII, p.246, pl. VI, fig. 2 a c, December. Bunda Plateau, Great Australian Bight, South Australia.

Pleuroxia arcigerens.

1894. *Hadra arcigerens* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.193, November. Central Australia.

1896. *Angasella arcigerens* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.192, pl. XIX, fig. 27, February. Finke R. Escarpment, Central Australia.

Pleuroxia oligopleura.

1894. *Hadra oligopleura* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.193, November. West Australia: Eyre's Sand Patch, 160 miles west of Eucla.

1896. *Angasella oligopleura* Tate, Rep. Horn Sci. Exped. Centr. Austr., pt. II, Zool., no text, p.219, pl. XIX, fig. 39, February. "Flinders Range S.A." error (interchange of localities with *T. wilpenensis*).

Pleuroxia radiata.

1905. *Xanthomelon radiatum* Hedley, Trans. Roy. Soc. South Austr., Vol. XXIX, p.163, pl. XXX, figs. 4, 5, 6, December. Mount Davies, Tomkinson Range, and Musgrave Ranges, Central Australia.

Pleuroxia lemani.

1916. *Angasella lemani* Gude, Proc. Malac. Soc. (Lond.), Vol, XII, p.41, fig. in text, March 20. Cape Borda, Kangaroo Island, South Australia.

Pleuroxia adcockiana.

1894. *Hadra adcockiana* Bednall, Trans. Roy. Soc. South Austr., Vol. XVIII, p.190, fig. in text, November. Tempe Downs Station, Central Australia.

1896. *Thersites adcockiana* Tate, Rep. Horn. Sci. Exped. Centr. Austr., pt. II, Zool., p.196, pl. XIX, fig. 26, February. Throughout the Larapintine area, exceedingly variable; three forms discussed and described but not named.

Bednall's shell was deeply umbilicated measuring "Major diameter, 14 mm.; minor, 12 mm.; altitude, 8 mm.; height of aperture, 7 mm.; length, 7.5 mm.; diameter of umbilicus, 2 mm."

Many specimens were collected by the Horn Expedition and unfortunately the lots were not kept separate and thus Tate reported as above noted but undoubtedly more than one species, not to mention subspecies, appear in the series now classed under *adcockiana*. One series consists of small shells with open umbilicus, and another comprises shells larger with umbilicus almost closed while the sculpture varies also. The shells with the narrow open umbilicus should carry Bednall's name, and a series from Krickaueff Range have the umbilicus hidden so that less than 1 mm. width shows. Bednall's shell is very finely sculptured with striae, but in the Krickaueff shells the sculpture becomes notable ribbing the shell more elevated and a specimen selected as type of the new species, *truca*, Pl. II, fig. 8, measures 16 mm. in diameter by 12 mm. in height. Other shells which unfortunately have no other locality save Central Australia vary in the other direction, the sculpture becoming stronger, the shell flattened and the umbilicus more open.

Pleuroxia everardensis.

1892. *Helix* (*Hadra*) *everardensis* Bednall, Trans. Roy. Soc. South Austr., Vol. XVI, p.64, pl. I, fig. 3 a c, December. Everard Range, 2000 feet, Central Australia.

Pleuroxia squamulosa.

1894. *Hadra squamulosa* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.193, November. Central Australia.

1896. *Chloritis squamulosa* Tate, Rep. Horn. Sci. Exped. Cent. Austr., pt. II, Zool., p.193, pl. XVIII, fig. 10, February. Palm Creek, Krickaueff Range, C.A.

1896. (*Chloritis*) *ophioderma* Tate, Rep. Horn. Sci. Exped. Cent. Austr., pt. II, Zool., p.194, February, new name only.

This species differs from most of the others in its sculpture. Depressed, spire a little elevated, coarsely granulate, no hairs, mouth large, open, lip thin, a little reflected, umbilicus narrow, deep. It is much more like a *Chloritis* than any other member of this series, but Hedley has classed it from anatomical data with the *Xanthomelon* series, while the Chloritid molluscs, by the same criterion, go with the *Hadra* group. The surface is complete granulose but there are no vestiges of hairs so that it apparently has no relationship with *Chloritis,* notwithstanding the resemblance. At present it seems best to indicate its peculiarities by a subgeneric name only, *Baccalena* nov.

Pleuroxia wilpenensis.

1894. *Hadra wilpenensis* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.193, November. Central Australia.

1896. *Thersites wilpenensis* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.219 (no text), pl. XIX, fig. 28, February. "Eyre's Sandpatch, W. Australia," error through interchange of localities with *A. oligopleura* "Flinders Range, S. Australia," i.e. six miles east of Wilpena Pound (Tomsett).

Pleuroxia musgal sp. nov. Pl. II, fig. 3.

1905. *Xanthomelon wilpenense* Hedley, Trans. Roy. Soc. South Austr., Vol. XXIX, p.163, December. Musgrave Ranges.

The specimens thus recorded are closer to *elderi,* as would be expected, than to *wilpenensis,* from which they are easily distinguished by their much finer sculpture.

Shell small, more elevated than typical *Pleuroxia,* sculpture of ridges much more numerous and better defined, coloration uniformly golden brown, apical whorls apparently smooth, but may be finely granose. Whorls four and a half, the last descend-

ing fairly rapidly. The mouth large, subcircular, open, lips slightly reflected, columella a little thickened and reflected over the very narrow umbilicus which appears as a chink only. Contrasted with *wilpenensis* it is larger, the umbilicus is differently formed, the mouth is more open and the columella characters do not agree. On the other hand *elderi* develops a different shaped mouth, is banded, almost smooth, radials subdued, granules appearing and the umbilicus is smaller, the columellar reflection more developed, with the glaze extending boldly across the shell to suggest a continuous mouth.

Type of *musga* measures: breadth 19 mm.; height 15 mm.

Pleuroxia elderi.

1892. *Helix* (*Hadra*) *elderi* Bednall, Trans. Roy. Soc. South Austr., Vol. XVI, p.64, pl. I, figs. 2 a-c, 4, 5, December. Birksgate Range, Central Australia.

The "Horn" shells apparently included two species as they provide two different forms, one approaching *musga* closely, the other as described under that species. The figure indicates the latter as the typical form, and for this must be introduced a new subgeneric name, *Fatulabia* nov. the somewhat flaring aperture differing markedly from that of *Pleuroxia*.

Pleuroxia hinsbyi.

1916. *Angasella hinsbyi* Gude, Proc. Malac. Soc. (Lond.), Vol. XII, p.42, fig. in text, March 20, ex Brazier MS. Mitchell District, Silvertown, New South Wales.

This locality is very close to the South Australian border, and this may prove only a variant of *wilpenensis*.

Genus **Basedowena** nov.

Type **B. cottoni** nov. Pl. II, fig. 24.

A series from the Musgrave Ranges, collected by the late H. Basedow, one of South Australia's best naturalists, as well as being otherwise very gifted, allows his memory to be memorialized as above. This constitutes one of the most distinct groups yet differentiated, apparently living alongside *Pleuroxia* and *Sinumelon* of two forms.

Shell of medium size, subglobose, apex elevated, whorls straight sided, last whorl large, swollen, outer lip thin, the outer edges expanded, flaring; umbilicus narrow, hidden by strongly reflected columella which is triangular in shape. A glaze connects the reflection with the other lip whose descending edge almost frees the mouth from the last whorl. The pointed spire, the circular mouth with the expanded edge and the curious columellar reflection easily separate this from all other Xanthomelontid molluscs.

The coloration is brown with the base paler, the sculpture of numerous rough radials being overrun by small granules, this granulation covering the apex and persisting throughout, being only a little modified on the base.

The type figured is a medium sized shell measuring: diameter 18 mm.; height 17 mm.: a larger dead shell measures 24 mm. by 23 mm.

Genus **Glyptorhagada.**

1890. *Glyptorhagada* Pilsbry, Man. Conch., (Tryon), Ser. 2, Vol. VI, p.191, December 16.
Logotype Pilsbry, ibid., Vol. IX, p.122, 1892. *Helix silveri* Angas.

1933. *Eximiorhagada* Iredale, Rec. Austr. Mus., Vol. XIX, p.51, August 2.
Orthotype *Xanthomelon asperrimum* Hedley.

1933. *Halmatorhagada* Iredale, Rec. Austr. Mus., Vol. XIX, p.51, August 2.
Orthotype *Helix bordaensis* Angas.

Shells varying from conical to flattened helicoids, with rugose plicate surface, sometimes granulose, periphery subkeeled or acutely keeled, mouth simple, umbilicus usually narrow, always open.

This series seems very unlike *Xanthomelon*, and suggests that the anatomical data need revision as to their value. Nothing much more unlike the type of *Xanthomelon* than *Glyptorhagada* could be produced.

Key to Species.

Shell with spire flattened (abnormal in type), periphery subkeeled, sculpture of irregular wavy riblets, umbilicus narrow deep, outer lip thin, columella slightly reflected *clydonigera.*

Shell with spire less elevated, sculpture coarser, umbilicus small almost hidden by reflected columella, outer lip reflected, mouth almost continuous *herberti.*

Shell with spire a little elevated, periphery semikeeled, umbilicus narrow, partly hidden, ribs less numerous than in preceding *silveri.*

Shell with spire depressed, periphery more keeled, ribs wavy more irregular, base rounded, columella rather straight, umbilicus not hidden *kooringensis.*

Shell still more flattened and broader, periphery acutely keeled, sculpture more pronounced, umbilicus wider, base much less rounded *pecuniosa.*

Shell similar in shape to last but with strong granular sculpture, no radials, umbilicus narrow, mouth descending, free *asperrima.*

Shell with spire flattened, with anteperipheral groove, base more rounded, strong wavy sculpture, umbilicus narrow, almost hidden *euglypta.*

Shell with spire flattened, anteperipheral groove, base rounded, periphery subkeeled, strong wavy sculpture, mouth small, lips thin, columella scarcely reflected, umbilicus medium, deep, *bordaensis.*

Glyptorhagada clydonigera.

1894. *Hadra clydonigera* Tate, Trans. Roy. Soc. South Austr., Vol. XVIII, p.193, November. Central Australia.

1896. *Thersites* (*Glyptorhagada*) *clydonigera* Tate, Rep. Horn Sci. Exped. Cent. Austr., pt. II, Zool., p.195, pl. XIX, fig. 24, February. MacDonnell Ranges, Central Australia (Rev. H. Kempe).

Glyptorhagada herberti sp. nov. Pl. II, fig. 19.

1905. *Xanthomelon clydonigerum* Hedley, Trans. Roy. Soc. South Austr., Vol. XXIX, p.162, pl. XXX, figs. 10, 11, 12, December. Musgrave Ranges, Central Australia.

Hedley fully described and figured this species as he recognised it did not agree accurately with Tate's *clydonigera*, but took refuge in the abnormality of Tate's type. Nevertheless he pointed out it was also larger, more finely sculptured and less elevated. This shell is not unlike typical *silveri*, but it recalls the smaller members of *Pleuroxia*, such as *elderi*, and the form of the columella has prejudiced the separation of these, the texture of the shell indicating the justice of this action.

Glyptorhagada silveri. Pl. II, fig. 21.

1868. *Helix* (*Rhagada*) *silveri* Angas, Proc. Zool. Soc. (Lond.), 1868, p.257, text fig. September 15. Eastern Plains, South Australia (S. W. Silver).

The typical *silveri* is elevated, but there are specimens merely labelled "Eastern Plains," which are much more elevated with a narrower umbilicus, and also varying strengths of sculpture. Local collecting must determine the value and reason of such variations. A paratype of *silveri* in the Australian Museum measures 20 mm. in diameter by 14 mm. in height, and a series from N.E. of Petersburg confirm this, a shell measuring 22 mm. in breadth and 15 mm. in height, the series being uniform.

Glyptorhagada kooringensis. Pl. II, fig. 20.

1877. *Helix (Rhagada) kooringensis* Angas, Proc. Zool. Soc. (Lond.), 1877. p.33, fig. in text, June 1. 30 miles N.E. from Burra Mines, South Australia (F. G. Waterhouse). Figd. Cox, Proc. Linn. Soc. N.S.W., Vol. II, p.1062, 1887 (animal): this belongs to *pecuniosa*.

This species varies in the opposite direction from the preceding as the type is not unlike *silveri*, but wth the last whorl prominently keeled. Many specimens are available which are strongly keeled, notably flattened and larger, sculpture stronger and umbilicus wider and these are here named *pecuniosa*, Pl. II, fig. 10, the general name "Kooringa" being given as locality. Mannahill is mentioned in one case, while a series from Pandappa Springs agree exactly with the type form, indicating *pecuniosa* to have a more northern range.

Glyptorhagada asperrima.

1901. *Xanthomelon asperrimum* Hedley, Trans. Roy. Soc. South Austr., Vol. XXIX, p.164, 3 text figs., December. Mann Ranges, Central Australia.

This is similar in form to the preceding *pecuniosa*, but the sculpture of separated tubercles is very different.

Glyptorhagada euglypta.

1899. *Glyptorhagada euglypta* Tate, Trans. Roy. Soc. South Austr., Vol. XXIII, p.241, pl. VI, figs. 3 a c, December. Anabama, 100 miles north-east from Burra Burra, South Australia (Brown).

This simulates the Kangaroo Island shells in form, being somewhat flat-topped, with a peripheral keel following an ante-peripheral groove, but rounded below.

Glyptorhagada bordaensis.

1880. *Helix bordaensis* Angas, Proc. Zool. Soc. (Lond.), 1880, p.419, pl. XL, fig. 3, October 1. Kangaroo Island, South Australia.

Genus Divellomelon.

1933. *Divellomelon* Iredale, Rec. Austr. Mus., Vol. XIX, p.51, August 2.

Orthotype *Thersites hillieri* Smith.

The acutely keeled very flattened shell of many whorls has a peculiarly thickened lip and a minute umbilicus: it does not resemble any other Australian shell and the sculpture is so obscure that its relationship cannot be deduced. It is placed here temporarily on account of its keeled form resembling that of some species of *Glyptorhagada*.

Divellomelon hillieri. Pl. II, fig. 23.

1910. *Thersites* (*Glyptorhagada*) *hillieri* Smith, Proc. Malac. Soc. (Lond.), Vol. IX, p.26, fig. , March 31.

Hermannsburg, South Central Australia (Hillier).

Family **Rhytididae.**

The snails of this family are carnivorous and are very easily recognised when living, while the shells are sometimes rather notably different. Many Australian forms have the upper surface rudely plicate, the under surface smooth, the whorls few, rather rapidly increasing on the same plane, that is, the spire flattened, the mouth large, oblique, wider than high, lips thin, umbilicus open and generally wide.

Genus **Strangesta.**

1933. *Strangesta* Iredale, Rec. Austr. Mus., Vol. XIX, p.48, August 2.

Orthotype *Helix leichardti* Cox.

This genus apparently occurs all along the East Coast of Australia and into eastern South Australia where apparently two species occur which may later be referred to two distinct groups.

The general description above given applies to this genus.

Strangesta gawleri. Pl. II, fig. 7.

1872. *Helix* (*Zonites*) *gawleri* Brazier, Proc. Zool. Soc. (Lond.), 1872, p.618, November 3. Mt. Lofty Ranges, South Australia.

1903. *Rhytida* (*Eurhytida*) *gawleri* Kobelt, Syst. Conch. Cab., Mart. & Chemn.), ed. Kuster, Bd. I, Abth. 12B, (heft. CLXXX, 486°lief.), Agnatha, p.37, pl. 7, figs. 12-14, (dated 26.XII.1902).

1932. *Rhytida gawleri* Cotton & Godfrey, South Austr. Nat., Vol. XIII, p.176, pl. 3, fig. 20, "August"=September 30.

Strangesta tumidula sp. nov.

Two small specimens from Robe agree with others sent to the Australian Museum many years ago by Professor Tate from the Mt. Gambier district under the above specific name. A MS. description therewith compared them with the Tasmanian *ruga*, but they seem more related to *gawleri* from which they may be distinguished by their greater elevation and finer sculpture. The measurement of Tate's type is "Max. diam. 17.5, min. 14.5, height 11 mm."

PLATE 1.

Fig. 1. *Sinumelon impletum* Iredale.
Fig. 2. *Pillomena aemula* Tate.
Fig. 3. *Cupedora patruelis* Angas.
Fig. 4. *Australbinula margaretae* Cox.
Fig. 5. *Eremopeas interioris* Tate.
Fig. 6. *Omegapilla australis* Angas.
Fig. 7. *Meracomelon s. extensum* Iredale.
Fig. 8. *Themapupa ischna* Tate.
Fig. 9. *Paralaoma decresensis* Iredale.
Fig. 10. *Magilaoma penolensis* Cox.
Fig. 11. *Semotrachia esau* Iredale.
Fig. 12. *Paralaoma stabilis* Iredale.
Fig. 13. *Exilibadistes s. bednalli* Brazier.
Fig. 14. *Elsothera nesana* Iredale.
Fig. 15. *Excellaoma neta* Iredale.
Fig. 16. *Excellaoma valens* Iredale.
Fig. 17. *Echonitor albumenoideus* Cox.
Fig. 18. *Roblinella speranda* Iredale.
Fig. 19. *Echonitor euroxestus* Iredale.
Fig. 20. *Stenopylis hemiclausa* Tate.
Fig. 21. *Discocharopa planorbulina* Tate.
Fig. 22. *Paralaoma riddlei* Iredale.
Fig. 23. *Austrosuccinea australis* Férussac.
Fig. 24. *Dipnelix pertricosa* Iredale.
Fig. 25. *Arborcinea arborea* Angas.
Fig. 26. *Bothriembryon mastersi* Cox.
Fig. 27. *Meracomelon m. suspectum* Iredale.
Fig. 28. *Meracomelon moorundianum* Iredale.

PLATE I.


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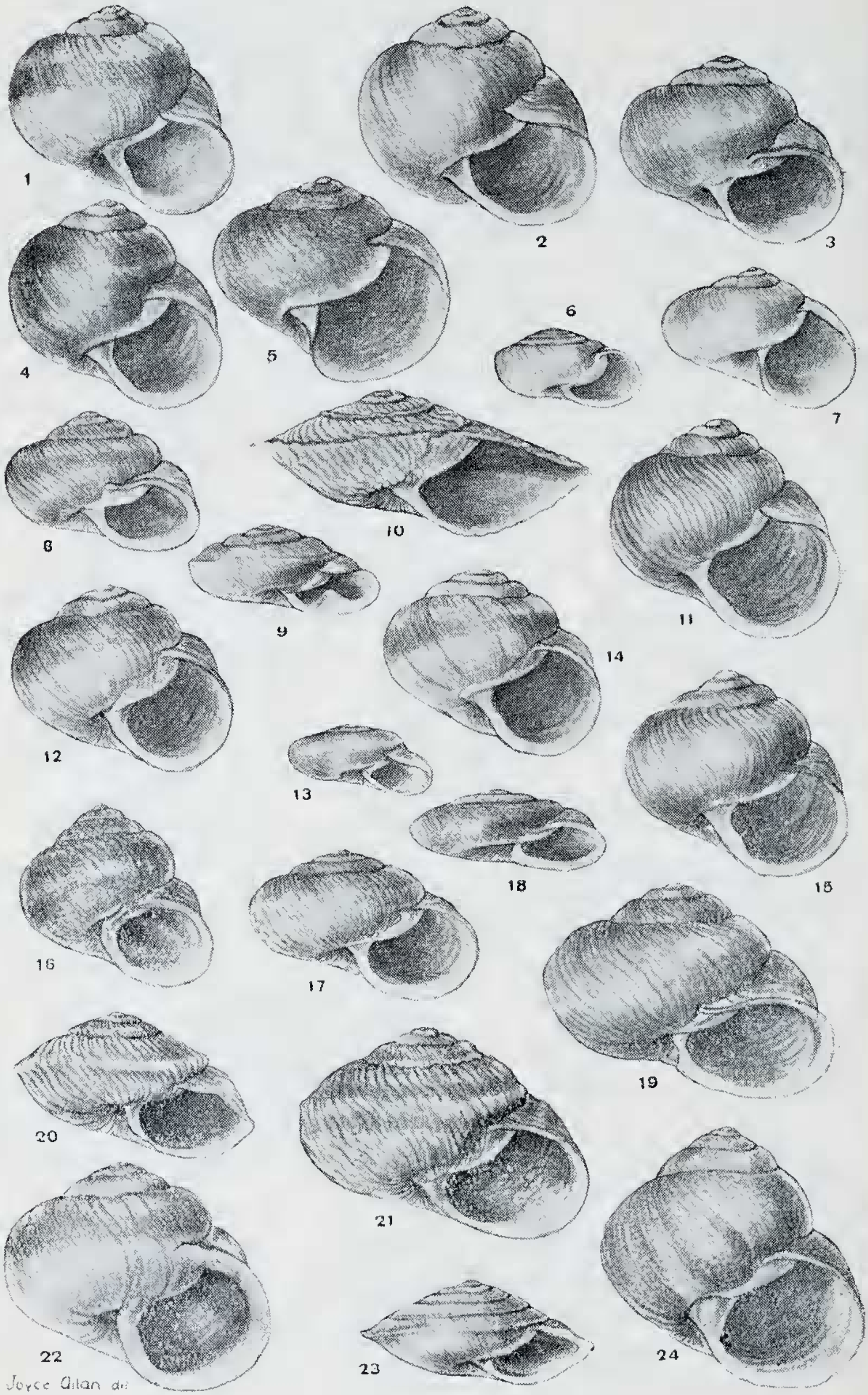
PLATE. II.



Joyce Allan del.

PLATE. II.

Fig. 1. *Sinumelon eupesum* Iredale.
Fig. 2. *Sinumelon pedasum* Iredale.
Fig. 3. *Pleuroxia musga* Iredale.
Fig. 4. *Sinumelon remissum* Iredale.
Fig. 5. *Sinumelon corinum* Iredale.
Fig. 6. *Vidumelon wattii* Tate.
Fig. 7. *Strangesta tumidula* Iredale.
Fig. 8. *Pleuroxia truca* Iredale.
Fig. 9. *Semotrachia mersa* Iredale.
Fig. 10. *Glyptorhagada pecuniosa* Iredale.
Fig. 11. *Sinumelon pumilio* Iredale.
Fig. 12. *Sinumelon fodinale serlense* Iredale.
Fig. 13. *Periclocystis ardeni* Iredale.
Fig. 14. *Sinumelon petum* Iredale.
Fig. 15. *Sinumelon aversum* Iredale.
Fig. 16. *Granulomelon grandituberculatum* Tate.
Fig. 17. *Pleuroxia mawsoni* Iredale.
Fig. 18. *Semotrachia basedowi mannensis* Iredale.
Fig. 19. *Glyptorhagada herberti* Iredale.
Fig. 20. *Glyptorhagada kooringensis* Angas.
Fig. 21. *Glyptorhagada silveri* Angas.
Fig. 22. *Sinumelon expositum* Iredale.
Fig. 23. *Divellomelon hillieri* Smith.
Fig. 24. *Basedowena cottoni* Iredale.